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SOCIETY OF SCOTLAND

WITH
AN ABSTRACT OF THE PROCEEDINGS AT BOARD AND GENERAL
MEETINGS, AND THE PREMIUMS OFFERED BY
THE SOCIETY IN 1946

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. *It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the Writers whose Papers are published in the 'Transactions.'*

JOHN STIRTON,
Secretary.

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TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

SCOTTISH AGRICULTURE DURING THE WAR.

By DAVID MARSHALL, M.C., M.A., B.L., Dunfermline.

An article of this kind can be written only with assistance from many quarters. I must, therefore, at the outset record a general vote of thanks to the many friends who have helped me, and I gratefully acknowledge the assistance derived from many publications. It is not possible to enumerate more than a few of these sources. 'The Scottish Journal of Agriculture,' and especially an admirable series of articles which appeared in it from January 1941 to January of this year under the title "Scottish Agriculture in Wartime," as well as two articles by Mr Joseph F. Duncan on "Agricultural Labour," which appeared in the issues for July 1941 and January 1946, have been most useful. Such Government publications as the statistics relating to the war effort of the United Kingdom and the accounts relating to our import trade and re-export trades from 1938 to October 1945 have yielded interesting material. I have laid heavy toll upon numerous other sources and upon many friends. I express my special indebtedness to the officials of the Department of Agriculture for Scotland, among whom in particular Mr William E. Heath and Mr M. Rudd devoted much time and energy to meeting heavy demands upon them from the mine of statistical and other information which the Department has in regard to every aspect of Scottish Agriculture, and to Mr D. Witney, Economics Advisor to the Edinburgh and East of Scotland College, whose advice and assistance were of great value. I have also received much help on a variety of technical and practical points from Mr J. W. Grant, Executive Officer to the West Fife and Kinross Agricultural Executive Committee.

My feeling of indebtedness for the help thus afforded to me is best measured by the fact that I am personally satisfied that the statistical tables and the statistical information used in the course of this article form the most valuable part of it. I trust, therefore, that the tables may be read as being far more than mere addenda. They do, in fact, present in themselves a wonderfully adequate picture of the chief aspects of Scottish agriculture during the war.

SCOTTISH agriculturists must often during the war have felt tempted to echo the words of Nelson at Trafalgar: "This is too warm work, Hardy, to last long." The pace which was set both by the Government and by the farmers themselves was indeed a hot one. In the result the story of what was accomplished confirmed once again the truth of the old saying that "War must be waged by waking men." Never before did Scottish agriculture rouse itself to greater effort in the national interest. Never before was everyone engaged in the industry more alert and active, so "waking," as during the past six years.

Certainly, in the struggle to assist in feeding the nation, the farming community enjoyed two great advantages. In the first place, our Scottish land responded to the unprecedented call which was made upon it with a generosity which astonished even those directly engaged in its management. The capacity for production which was thus shown spoke volumes for the careful husbanding of its resources during the depression of the preceding years. In the second place, the farmer and his staff enjoyed the privilege of remaining on their own jobs, and, in the vast majority of cases, in their own homes. At a time when not only Service men and women but also the civilian population incurred mobility of work and of residence to a degree unknown in previous wars, the farmer was permitted to tackle his own particular job and to do so in familiar surroundings. We know that many of the younger generation fretted over the prohibition against joining their comrades on active service and drew little satisfaction from the assurance, which was fully justified, that they were assisting the nation best by remaining where they were. Even they, however, realised and responded to their good fortune in finding scope for national service in carrying on the work to which they were already trained, and in doing so without the upheaval and increased responsibility which a change of home and, still more, a change of job always involve.

It is, of course, true that, despite these advantages, circumstances made agricultural work specially onerous and difficult. Extremes of weather, the lack of skilled labour, the short supplies of animal feeding-stuffs, manures, and equipment of every kind, the special difficulties caused in farm work by the "black-out," and the complete change which on many holdings had to be made in the previous systems of rotation and management are only illustrations of the factors with which the farmer and his staff had to struggle, often in an increasing degree, throughout the war. In that respect the advantages which they enjoyed were offset by difficulties in surmounting which they had to make heavy calls upon their initiative, toughness, and courage.

THE LINE OF APPROACH.

It will be convenient if, at the outset, I summarise the way in which I propose to approach the subject of our war-time agriculture. The industry's effort can be adequately viewed only against the background of the position of the nation as a whole, and I shall attempt, in the first place, to sketch in broad outline that position as it existed prior to and during the war, especially in regard to food and other necessary supplies. Against this background the special task which was set the agricultural industry becomes clear. It seems appropriate thereafter to give some account of the interesting system which was set up for the administration of agriculture during the war.

At a critical period of the struggle Mr Winston Churchill

made an appeal and gave an assurance to the United States in a phrase which is now part of our common language: "Give us the tools and we will finish the job." Adopting that metaphor, I propose in the next place to describe how and to what extent our farmers, working with the land available to them and within the administrative system, were able to "finish the job." We can then appropriately conclude with some account of the principal "tools" with which the farmer was supplied for carrying out the work. Proceeding on these lines the opportunity may be taken of incorporating in the text some interesting detail which does not lend itself to statistical form, and the statistical tables which appear on pages 58 to 77 can be placed in proper perspective.

THE NATION'S FOOD SUPPLIES AND SHIPPING.

First, then, let us look from the national standpoint at the background against which the farmer worked and against which his task fell to be defined. For our present purpose the position can be most readily understood when seen from the point of view of imports and shipping. Prior to the war, and reckoned in money value, only 40 per cent of our food was home-produced. Further, no less than 66 per cent of our concentrates for animal feeding was imported, so that, for the production of 40 per cent of home-produced food, we were in turn dependent on importing two-thirds of the concentrates necessary to yield that contribution in meat, milk, and other human foods. Not only an army, but also a nation marches on its stomach, and, at the outbreak of war, the problem of supreme importance with which this country was faced was that which has always arisen for the inhabitants of a beleaguered fortress. We knew the increased efficiency of the submarine and the extent to which Germany relied upon this weapon in reducing our fortress. Heavy shipping losses were inevitable, and the substitution by home-produced foods of what could be imported in ships was a problem demanding immediate solution if we were to survive. Shipping, like agriculture, had been sorely neglected between the wars and was in short supply. Inevitably, therefore, the nation had once again to turn to our own land for supplies which would offset the very heavy volume of imports on which we had come to depend and which, in view of Service requirements and of the inevitable losses in tonnage, could not possibly be continued.

This general aspect of the scene is, however, far from being complete. The need for home production was urgent during the first Great War, but events moved between 1939 and 1945 in such a way that the call for home production during that period was of a much more urgent character than during the earlier struggle. It is interesting to glance at some of the major events of these years and thus to appreciate the extraordinary degree to which each and every major crisis made a direct call upon our shipping resources and made the possibility of importing

food a matter of supreme uncertainty. After six months of "phoney war," Germany invaded Norway on 9th April 1940, and broke through the Ardennes on 10th May. Dunkirk followed early in June, and Italy's declaration of war on the 10th of that month was followed by the surrender of France on the 17th. From that time Britain was faced with a position in which the enemy was in possession of the Continental coast from Narvik to Bayonne. Traffic in the Port of London, which was always regarded as an essential lifeline, was reduced to one-fourth of its normal volume. The English Channel, threatened by the enemy's guns and light craft, made a hazardous lane for our shipping. Southern Ireland denied us the use of its harbours for naval operations. The wonder is not that imports to this country decreased, but that imports came through at all in any quantity. Our critical position was, however, to become still more difficult. The form and the location of attack to which we were committed combined with the necessity of defence to make the need for shipping still more pressing. Japan raided Pearl Harbour in December 1941. Singapore fell on 15th February 1942. Our active participation in the Far Eastern War made a further heavy call on our resources in naval and merchant vessels and crews. Meantime, the Mediterranean, on which our forces in the Middle East depended, was for all practical purposes a *mare clausum*, and the defence and supply of Malta were among the most heroic deeds of the war. Sufficient shipping had, therefore, to be found for the long sea passage round the Cape. It was found. We attacked at El Alamein on 23rd October 1942. In the following month the North African landing, with its enormous calls upon our shipping resources, was effected, and it was followed up to the fall of Italy on 8th September 1943. Then followed D-day on 6th June 1944, and the necessity not only of landing the largest amphibious force in history but of building up for the triumphant march through France and the Low Countries and through Germany to its ultimate surrender at Munich on the 7th and 8th of May 1945.

The marvel is how all these situations were met and how victory was wrung in circumstances each of which made ships of every class and tonnage a vital requirement. All this, too, in the face of such facts as that over $4\frac{1}{2}$ million tons of British and Allied shipping were lost in the Atlantic in 1940 and 1941, and that, apart from these enormous losses, there were in March 1941 over $2\frac{1}{2}$ million tons of damaged shipping accumulated in our ports for repair. Looking at the situation from this point of view one appreciates—and only in this way one can appreciate—that the measure of the success or failure of Scottish agriculture during the war is the extent to which it was able to substitute home produce for imports, and thus to contribute directly to the release of that shipping without which defeat could not have been averted or victory won.

The dimensions of the practical problem thus set in feeding our besieged island can readily be appreciated by a glance at the recent Government publications of accounts relating to the

import trade and re-export trade of the United Kingdom. For our present purpose the following figures culled from these official sources will suffice.

One of the chief features of the changes rendered necessary in the character of imports was a drastic cut in imports of bulky commodities of low average value, an outstanding example of which were animal feeding-stuffs. Thus, while we imported in 1938 10 million tons of grain and flour of all kinds, these imports had fallen by 1944 to less than 4 million tons. Imports of barley and oats disappeared altogether in 1943 and 1944, and imports of wheat fell as low as 56 per cent of their pre-war quantity. In the case of maize, on which our live stock depended so greatly, we find that, while our imports in 1938 approached 58 million tons, they sank in 1942 to less than 3 million tons, and were only half that quantity in 1943. The measure of our personal need is further seen in the fact that in 1938 we re-exported grain and flour to the value of over half a million pounds, while in 1944 we re-exported less than two thousand pounds worth.

The dependence of British farmers on imports of animal feeding-stuffs is shown by the fact that in 1938 we imported over 400,000 tons of bran and pollards, and over 268,000 tons of cotton-cake and meal. Not a ton of either commodity was imported in 1943. A similar position existed in regard to all our most valuable feeding-stuffs, and the steady and alarming deterioration of the position is clearly reflected in the following totals of inclusive figures of imports of animal feeding-stuffs between 1938 and 1943 :—

1938 tons	1940 tons	1941 tons	1942 tons	1943 tons
1,903,697	1,064,319	323,737	74,356	11,943

It is, of course, true that there was a substantial increase in certain of the war years in the imports of oil seeds and nuts, the residues of which were available for animal feeding, but the position as a whole was recently summed up by the Minister of Agriculture as being that while before the war we imported about 8½ million tons of goods available for the feeding of animals, such imports decreased rapidly by no less than 7 million tons.

The whole of this loss of imports was not due solely to lack of shipping. In many cases the countries from which we were in 1938 drawing supplies were in enemy occupation. Thus, in 1942, we received no imports whatever from countries which in 1938 had been supplying us with animal feeding-stuffs to a value of over 11 million pounds. In 1943 our only substantial import of prepared feeding-stuffs was 11,000 tons of fish-meal from Iceland.*

THE TASK SET TO AGRICULTURE.

This outline of the situation in regard to imports and shipping as it existed and developed through the war in itself defines the task with which agriculture was faced. The problem finds its

definition in the replies which it was necessary to find to three practical questions.

In the first place, to what extent and how quickly could we substitute home produce for imported food ?

In the second place, to what extent and how quickly could the imports on which our home production itself relied be dispensed with or rendered unnecessary by substitutes grown or produced in this country ?

In the third place, since a balanced ration is essential both for men and animals, what steps were necessary, in attaining maximum self-sufficiency, to alter the existing character and volume of what we ourselves produced ?

The last aspect of the problem was primarily one for solution on the advice and under the guidance of our experts in dietetics, and right well did these dietists advise on this important matter. It happened that an inquiry into the whole question of national diet had, late in 1939, just been completed by a body of experts under the direction of Sir John Orr. It is understood that the results of that inquiry were so distressing that the report has never yet seen the light of day. The material, however, was available to the Government and formed the basis of the admirable rationing system which was devised and enforced during the war.

In its first two aspects, however, the problem was eminently one for the agriculturist. It was to him that the nation must look for such an increase in the home production of essential foods as to make the country as completely as possible independent of imported food, and, as one way of securing that increase, for such an effort towards the self-sufficiency of every farm as to enable its production of crop and stock to be maintained with similar independence. The essence of the task thus set to agriculture is well expressed in a comment by Commander Kenneth Edwards in 'Operation Neptune': "The possession of sufficient shipping was the most vital requirement of invasion, and all who strove to make shipping available fought and worked for the success of the invasion."

THE ADMINISTRATIVE SYSTEM UNDER WHICH AGRICULTURE WORKED.

The Emergency Powers (Defence) Act, 1939, was passed on 24th August 1939. This Statute was the foundation of the very wide powers handed over by Parliament to the Executive for conduct of the war and of the extraordinarily detailed regulation of the lives which we led from 1939 to 1945 and, to a considerable extent, are still leading. The Defence of the Realm Act, 1914, had authorised His Majesty by Order in Council to make regulations "for securing the public safety" and the "defence of the Realm." The 1939 Statute gave much wider scope to the Executive by authorising the making of such Regulations "as appear to be necessary or expedient for securing the public safety, the defence

of the Realm, the maintenance of public order and the efficient prosecution of any war in which His Majesty may be engaged, and for maintaining supplies and services essential to the life of the community." It was under the authority of this Act that the Defence (General) Regulations, 1939, were issued on 25th August. This code, subject to considerable amplification and amendment as the war progressed, is that under which the affairs of a nation engaged in total warfare were administered for the ensuing six years. It is unnecessary for our present purpose to follow the history of these Regulations through the maze of addition and alteration which were dictated by changing conditions—a maze in which many a law-abiding citizen found himself lost. In the main, the Statute and the General Regulations thus passed in August 1939 stood up extraordinarily well to the practical needs of the situation as it developed, and much credit is due to their authors not only for their timeous enactment but for the care and thoroughness with which they had been prepared against the emergency which arose. While the Emergency Powers Act authorised His Majesty by Order in Council to make Regulations of the type already described, the Defence Regulations in many cases themselves took the form of authorising in turn the Government Departments to make appropriate Orders. It was under this pyramid of Departmental legislation that there was built up that intimate and detailed regulation of our lives to which we accommodated ourselves with such remarkable rapidity.

Orders made in terms of these enactments over-rode both existing legislation and existing contracts, and, as experience was to show, agricultural leases and normal relations between landlord and tenant formed one of the groups in which interference with existing contract was considerable.

Defence Regulation 51 empowered any competent Authority to take possession of land, and it was under this far-reaching Regulation that all Government Departments proceeded in meeting the requirements of their particular service. It was under it, for example, that the Secretary of State for Scotland took possession of farms and of deer forests, and it is convenient at this point to give some account of the considerable extent to which the Government thus found itself directly charged with the practical management of arable and grazing land.

Farms and Grazings in Government Possession.—On occasion, where the tenancy of a farm was compulsorily terminated, the holding was in such bad order that it was not practicable to find a new occupier who was prepared to take the holding on lease and to expend the money necessary to bring it round to reasonably good condition. In such cases the Government themselves took possession of the subjects and normally entrusted the local Agricultural Executive Committee with their management. The Committees, composed as they were of men of standing and experience in their own localities, proved admirable agents for the work, and their technical officers enjoyed the opportunities thus given of testing in practice the possibilities of land which,

although at the outset in poor shape, was of much the same character and quality as those in their Committee areas. The only note of warning which perhaps ought to be struck on this point is that, in the circumstances, the system of management of these holdings and the satisfactory financial results obtained cannot be claimed as examples of "farming from Whitehall."

While a considerable area of land fell under Committee management in the circumstances just described, much the greater area of land of which the Department of Agriculture were in possession during the war consisted of deer forests. In the summer of 1940 the Land Court, at the special request of the Department, made a survey of the forests in Caithness, Sutherland, Ross and Cromarty, Western Inverness, and North Argyll. Their report, which is of more than passing value, disclosed that of 72 deer forests extending to over $1\frac{1}{2}$ million acres, only 3 could be regarded as being incapable of carrying live stock even during the summer. These 3 extended to some 45,000 acres and grazing was regarded as impracticable mainly on account of their altitude. Seven forests, extending to about 120,000 acres, were already fully stocked, and 5, embracing 160,000 acres, were then in process of being stocked. Of the remaining 57 forests, with an area of close on $1\frac{1}{4}$ million acres, no fewer than 42, covering some 990,000 acres, were reported as capable of carrying permanent stock, while on 15, extending to about $\frac{1}{4}$ million acres, summer grazing of stock was regarded as practicable. In these circumstances the Land Court reported that an immediate increase of over 32,000 permanent sheep stock, and of an additional 26,350 in summer only, was practicable, and that the grazings could carry also a permanent stock of 450 cattle with 1660 more in summer. This reserve of facilities for food production could not be disregarded in the critical days of 1940. It seems at least doubtful whether it can be disregarded in the future. After receipt of the Land Court's Report, the Secretary of State, in the autumn of 1940, took possession of 3 deer forests, extending to over 90,000 acres, and placed on 2 of these a permanent sheep stock of 4500. One of these 2 forests was shortly thereafter handed back to the proprietor who took over the stock, while the third provided grazing for adjoining farms. A similar policy was, on occasion, followed throughout the war, with the result that in April 1942 the Government were in possession of 4 deer forests, extending to over 72,000 acres, and in November 1942 of 5 extending to over 80,000 acres. The maximum was reached when in 1943 and 1944 there were 8 deer forests, extending to 170,000 acres, thus in the Department's possession. Of these 8, 3 were stocked and managed directly by the Department of Agriculture, 1 was let on lease, and the remaining 4 were in the hands of the local Agricultural Executive Committees.

As regards other land in the Department's possession, the maximum number of arable and mixed farms was 80, with an acreage of 12,890 acres. This was in 1945. The maximum area had, however, been reached in the previous year when there were

79 holdings, extending to close on 20,000 acres, in Government possession. The maximum in respect of sheep farms was reached in 1945 when there were 5, extending to about 49,000 acres. Of the arable and mixed holdings 27 were let to tenants and 49 were managed by Agricultural Executive Committees. The remaining 3 had been reclaimed by drainage schemes, and the Department were directly engaged in bringing them into cultivation.

An interesting statement has now been issued, giving the profits and losses incurred both by the Department and by the Agricultural Executive Committees in their management of these lands. The figures represent accumulated profit or loss as at 30th November 1944. The total acreage occupied by the Department amounted to 121,597 acres and consisted of land in the Counties of Argyll, Ross and Cromarty, Stirling, Sutherland, and Wigtown and the Stewartry. With the exception of Torosay in Argyllshire, which showed a profit of £3517, these holdings incurred loss—to a total of £10,313. The farms occupied by Agricultural Executive Committees comprised a total acreage of 11,516 acres spread over fourteen Counties. Results as a whole show that under Committee management, profits to 30th November 1944 amounted to £36,257, while losses amounted to £12,008—a net profit of £24,249. In calculating profit or loss, no account is taken in these figures of interest on capital, insurance or administrative expenses. On the other hand, annual charges are made in respect of depreciation of buildings and other permanent equipment provided on the farms by the Committees.

These results can be regarded as satisfactory. The holdings of which possession were taken and retained were either "C" farms, which were in effect making little, if any, contribution towards the national effort, or unstocked deer forests. Substantial losses during the opening years of the reconditioning or stocking of such land were almost inevitable. The net profit, which was in fact earned by the Committees, reflects both the sound efforts in management of the members and staffs and, of still more importance, the possibilities of such land when adequately equipped, managed, cultivated, and manured. The losses incurred on the lands occupied by the Department may also be regarded with equanimity. If acclimatisation is of anything like the value attributed to it in sheep-stock valuations, it is not surprising that stocks bought at open market prices during the war and placed on new ground should involve their owners in loss during the opening years of the new regime.

We return now to the discussion of the Administrative System which was set up for agriculture. Defence Regulations numbered 61, 62, 63, and 66 were those specially affecting agriculture. Under Regulation 61 the Secretary of State for Scotland was authorised to prohibit the diversion of agricultural land to other uses. It was under this Regulation, as amended, that certain Orders were issued prohibiting trespass on farm lands and allotments, and it was in the spirit of the Regulation that a rule was later adopted to the effect that, before agricultural land could be

diverted to other purposes, the views of the Department of Agriculture and, through them, of the local Agricultural Executive Committees, must be obtained by the Authority desiring such diversion.

Defence Regulation 62 was one of the most important of the series. Its original terms were from time to time amended as experience was gained, and it was under it that the Department of Agriculture and the Agricultural Executive Committees operated in giving directions as to the management and cropping of agricultural land, and took action in regard to the termination of tenancies. In its final form, the Regulation empowered the Secretary of State to "give such directions with respect to the cultivation, management, or use of land for agricultural purposes as might be thought expedient for the purpose of promoting, increasing, or maintaining the production of articles necessary for the efficient prosecution of the war or for maintaining supplies and services essential to the life of the community."

"Agricultural purposes" were defined as including the purposes of dairy-farming, poultry-farming, live-stock breeding, live-stock keeping, vegetable-growing, fruit-growing, and market-gardening. From November 1941, Regulation 62 further brought into operation a rule aimed especially against land speculation. It was enacted that, where the whole or any part of an agricultural holding had been subject to a contract of sale made since 3rd September 1939, or had been sold in pursuance of a contract of sale made since that date, any notice to quit given to the tenant should be null and void unless the consent of the Minister to the notice was obtained. Such consent was asked in 130 cases and granted in 52 of these. In 57 cases the applications were refused and 8 applications were withdrawn.

Termination of Tenancies.—It was perhaps inevitable that the exercise of the Secretary of State's power to terminate an agricultural tenancy was the occasion of criticism which was, in some instances, more vitriolic than arose from the exercise of any other single power entrusted to the Executive. The initiative in the termination of any tenancy lay with the local Agricultural Executive Committees, and one has only to consider—in the light of the peremptory powers which these Committees possessed—the number of cases in which tenancies were actually terminated to realise that such action was taken with caution and with reluctance. No tenant was evicted until he had had an ample opportunity of rectifying the management of his farm and had received ample and express warning that continued failure to co-operate adequately in meeting the national requirements would lead to the termination of his lease. Further, in their consideration of the recommendations of the Committees, the Department before coming to a decision usually had the farm inspected by their own technical advisers and also frequently obtained an independent report on the state of the farm. The number of agricultural holdings in Scotland is 78,424. The power of terminating tenancies was exercised only in 73 cases.

Regulation 63 authorised the issue of orders for the destruction by the occupier, or other person having the right, for the purpose of preventing damage to crops, trees, &c., of any game, deer, vermin or pests. Under a separate subsection the Regulation also empowered a tenant, after appropriate notice to his landlord or factor, to burn heather during certain periods notwithstanding any provision of the 1926 Act or any prohibition in the tenant's lease.

Under Regulation 66 the Minister was authorised to delegate, to such extent and subject to such restrictions as he might specify, to any person or body of persons appointed or approved by him all or any of his functions under the above Regulations. It was under this provision that the Agricultural Executive Committees operated and undertook the wide and detailed duties which were entrusted to them in relation to the management of land and live stock during the war.

The administrative system created in terms of these Regulations was one in strong contrast to that which was in operation during the last war. From 1939 onwards the agriculturist moved in a world in which his actions were directed and controlled to a degree never before experienced in this country. Only an appreciation of the dire situation of the country could have reconciled to such a position a body of men previously noted for their independence of thought and action, and especially wedded to conducting their own business in their own way. The strength of a nation lies in its belief in the value of liberty and freedom, but the test of a civilised State is the extent to which its citizens recognise that freedom rests ultimately on the acceptance of law and order. Agriculturists as a class may justifiably claim to have stood up well to this test, and to have recognised that the ultimate liberty for which we fought hung in the balance and that, in order to secure it, complete subservience to the requirements of the State was for the time essential.

One looks back with something approaching wonder to the comparative freedom which farmers enjoyed between 1914 and 1918. It was not until 23rd June 1915 that a Departmental Committee was appointed to report what steps should be taken, by legislation or otherwise, for the sole purpose of maintaining and, if possible, increasing production of food. After our recent experience, it appears to us remarkable that this Committee felt justified in reporting against legislation or compulsion of any kind, and in general recommended that maintenance and increase of production could be attained by voluntary effort. The attitude of the general public as well as of the farmer at that time is clearly reflected in the following comment by Doctor Charles Douglas in the article corresponding to this which appeared in the 'Transactions' for 1919. He says :—

"Increased production was regarded as important, but not as being so vital as to justify a violent interference with the normal procedure of farmers in accordance with economic conditions."

Such a comment has the atmosphere of a different world from that to which we have now become accustomed. Matters, however, proceeded on these lines until December 1916, when submarine losses were creating a more perilous position for the country. The Departmental Committee was again invited to meet, and, on this occasion, they recommended that powers of compulsion in regard to cultivation should be conferred upon the Board of Agriculture. To provide information and guidance to the Board in operating these powers small Executive Committees for each local Government area were appointed. The function of these Agricultural Executive Committees, staffed by a Secretary and an Executive Officer, was merely to report to the Board on any case in which it was considered that additional land in the respective areas should be put under the plough. Their functions were later extended to giving advice on many matters, such as the granting of licences to sell horses, the issue of permits to obtain petrol, and the certification of farm workers for exemption from military service. In contrast to the administrative system, which has been in existence during this war, compulsion to cultivate was rare, and the power of compulsion was retained in the hands of the Board of Agriculture.

No such easy passage was possible in 1939 for the farming community, or, indeed, for any other section of the community. On 4th September 1939, that is to say on the day following the outbreak of war, the Secretary of State appointed an Agricultural Executive Committee for each of forty districts in Scotland. By the same Order the Chairmen, Secretaries, and Executive Officers were nominated, and there was circulated to each member of Committee a Memorandum on Increased Cultivation. The state of preparedness of the Government as indicated by this immediate move is noteworthy, and, looking back, we can appreciate the extent of the nation's indebtedness to the Government servants who thus ensured that the contribution of agriculture on which the nation was so greatly to depend should commence without delay and should be planned with method and imagination.

In view of the position in which, as we have seen, the nation stood on the outbreak of war, it was appropriate that the Memorandum on Increased Cultivation should define the paramount duty of Agricultural Executive Committees as that of reducing to the utmost the country's dependence on imported food and animal feeding-stuffs. It recorded that the Department, after careful examination of the statistics of agricultural production, estimated that the cropping area in Scotland could be increased for the harvest of 1940 by at least 260,000 acres, and that this additional cropping area had been provisionally apportioned among the Committees. The acreages of the principal crops and of grass in 1918 and 1937 were stated, and forms of report on each farm in the Committee's area were supplied. The Memorandum proceeded to describe the powers delegated by the Secretary of State to the Committees. It recommended that an immediate survey of the farms in the Committee area should be made, and

that holdings should be classified in accordance with their quality and standard of management as follows :—

Class A—Well managed ; fully cropped.

Class B—Well managed, with possibilities of increased cropping.

Class C—Not well managed ; scope for increased production by better efficiency or change of practice.

That classification, as it proved, was to stand the test of experience throughout the war, and, indeed, taken by and large, the plan for attaining increased production thus outlined on 4th September 1939 proved of remarkable efficiency and of more permanent value and strength than could have been anticipated even by its authors.

The Memorandum was revised for the first time in June 1940, and subsequent advice and instructions of a similar character were circulated to Committees from time to time. The changes were largely those dictated by experience and national need, and it is unnecessary to pursue these aspects of the administrative system in detail.

The chief function of the Agricultural Executive Committees thus established was to act as agents in carrying into effect the Government's programme for increased production. Committees were, therefore, throughout the war, primarily engaged in effecting and maintaining maximum increases in tillage area ; in securing that acreages, prescribed by the Government, of specific crops of special value were grown in their respective areas ; and in attaining and maintaining a minimum standard of good husbandry. While it is unnecessary to detail the steps taken by the Committees in the performance of these functions, it is interesting to note that in Scotland there are 78,424 agricultural holdings exceeding one acre in extent, as compared with 379,880 holdings of similar size in England and Wales. The Scottish total is made up of 17,420 holdings with up to five acres of crop and grass and 58,359 holdings of greater size, with, in addition, 1764 holdings consisting only of mountain and heath land, 241 "landless holdings," and 640 common grazings.¹ A fair estimate of the volume of work devolving upon the members of Agricultural Executive Committees can be made on the basis of these figures.

The performance of their duties involved regular and periodical inspection of each of the 78,424 holdings, the discussion with each occupant of existing and future cultivation, and oversight of the standard of husbandry in cases where the existing standard was unsatisfactory. Certain powers of compulsion were delegated to the Committees by the Cultivation of Lands (Scotland) Order, dated 4th September 1939, and it was in the exercise of these powers that the familiar Direction Orders were issued. In view of the criticism which has on occasion been made of the Com-

¹ When one talks of the number of agricultural holdings in Scotland one usually refers to the number of separate agricultural returns made to the Department. It will be appreciated that this is an inaccurate way of dealing with the matter, and an article on this interesting question by Mr W. E. Heath appears in the 'Scottish Journal' of 3rd July 1945, under the title, "A New Classification of Holdings."

mittee's action, it is worth noting that such Direction Orders were in very many cases issued, not with the main object of exercising compulsion, but for the protection of the occupants themselves where, as in the case of the grassland ploughing scheme, such Orders formed the farmer's voucher for subsidy or where, in the national interest, some departure from the recognised or contractual rotation of crop was essential, and the Order safeguarded the tenant against complaints or claims in respect of departure from his lease. The extent of the friendly co-operation throughout Scotland between the Committees and the farmers can perhaps be most accurately gauged by the fact that, notwithstanding the many thousands of Direction Orders which were issued, the number of cases reported to the Department of Agriculture for prosecution in respect of failure to comply with cultivation orders was only 230, while only 133 prosecutions were actually taken.

As time advanced the Committees experienced a somewhat startling expansion in the number and extent of the duties which they were called upon to perform. The surprise and, on occasion, the dismay with which the members viewed this increasing volume of work may well have been greater than that experienced by the Government Departments concerned. In the letter addressed by the Department of Agriculture to Chairmen on 5th September 1939 the duties of the Agricultural Executive Committees were summarised as follows :—(a) To secure increased cultivation and production of crops ; (b) to take any local action that may eventually be required in regard to the supply and distribution of fertilisers and feeding-stuffs, machinery, implements, and seed ; (c) to deal with labour questions ; (d) to assist the central authority in conserving and augmenting live stock ; and (e) to apply measures for the destruction of agricultural pests. With their local knowledge, however, and with the technical assistance which was from time to time provided, the Committee members proved admirably suited for the administration of schemes for the supply of licences and permits of many kinds, for the investigation of cases relating to farm labour and military service, and for a hundred and one other functions the discharge of which called especially for local knowledge and un-biassed judgment. Space does not allow of following in any detail this growth in the scope of Committee work. In justice, however, to the invaluable service voluntarily rendered by the members, and as illustrating the extent to which authority impinged upon the farmer's life, it is interesting to give an example of the character and volume of the minor duties thus discharged by a typical Committee. During the war that Committee issued over 3000 individual permits for protective clothing, over 3500 permits for rubber boots, over 800 permits for cartridges, and almost 400 permits for motor tyres. In addition, licences or permits were issued covering such varied supplies as dairy towels, strychnine for destruction of moles, timber for farm repairs, potash and, in the 1943 season, lime. Fencing material also was in short supply, particularly in view of the necessity which arose of protecting land brought under crop, and, to ensure the best allocation of what was available,

detailed investigation was necessary towards the granting of some 2000 permits for the purchase of wire. Prior to 31st March 1941, such wire had been distributed through ordinary trade channels, but thereafter a quota, against which permits could be granted, was allotted to each Agricultural Executive Committee. Between that date and 31st December 1945 the Committee issued permits to individual landlords and tenants covering a total weight of wire of 17,572 tons. A steady growth occurred in the weight thus allocated in small quantities. In 1941-42, 2737 tons were put at the disposal of Committees; this increased to 4186 tons in 1944-45.

Not the least onerous duty which devolved on the Agricultural Executive Committees was that of handling public money, and of accounting monthly to the Department for the substantial sums which passed through their hands. The total amount thus collected and disbursed from 3rd September 1939 to 31st December 1945 by the Committee already referred to amounted to £577,175. This total excludes any figures in respect of the local Tractor Section which that Committee ultimately managed, and excludes all sums, such as subsidies or acreage payments, paid directly to the farmers by the Department. The latter, besides undertaking these direct responsibilities in regard to finance, had to deal with the accounts of forty Committees. These facts and the figures given at various points in this article show the enormous volume of work which thus devolved upon the Department's Finance Branch. The fact that, in the case both of the Department and of the Committees, the greater part of the money had to be collected or disbursed in "penny numbers" emphasises the volume and the value of the work done by them on the financial side.

So much, then, for the character of the farmer's job and for the administrative system under which it was carried out. We can now pass to an attempt to assess the manner in which and the extent to which that job was accomplished. In order to do so it is necessary in the first place to discuss the essential factor in production—namely, the land which formed the raw material from which the food required by the nation was to be obtained. Thereafter the way is clear for a description of the manner in which that raw material was utilised to best advantage.

THE RAW MATERIAL.

The Available Land.

In order to appreciate what was accomplished by Scottish agriculture during the war, it is necessary to estimate the extent of the land available to meet the call for increased production. Scotland comprises an area of 19 million acres. Of this, however, less than 5 million acres can be regarded as suitable for the growing of crop. In that 5 million acres there is included the land which is normally under crop or laid down to temporary or permanent

pasture. (It is convenient to refer to this as the "arable area," so long as the term is not confused with "arable land" as used in the Agricultural Returns to include only the acreage under crop and rotational grass.) The remainder of the country consists of 9 million acres of mountain and heath land, suitable for rough grazing, and 5 million acres which are of such mountainous character as to be useless for agricultural production.

The efforts of Scottish agriculture which would be most profitable to the nation during the crisis had necessarily to be focussed upon the arable area, and some greater precision in defining its extent is, therefore, desirable. In 1918 that area was returned at 4,751,000 acres, whereas in 1939 it stood at the reduced figure of 4,558,000 acres. There had, accordingly, been a leakage of over 200,000 acres between the wars. While this decrease is partly accounted for by greater accuracy in the Agricultural Returns and, doubtless in some degree, by a transfer of land from the arable category to that of rough grazing, there was undoubtedly considerable absorption of much sound arable land for housing, public works, and military preparations. Whatever the reason for the decrease, it will be appreciated that to a substantial extent the scope for increase of home production appeared less in 1939 than it was between 1914 and 1918.

Nor were the $4\frac{1}{2}$ million acres which were available in 1939 left intact. One of the chief encroachments upon it was inevitably that made by the Services for the accommodation of the Armed Forces.

Service Requirements.—The Land Agents of the three Services in Scotland have kindly afforded the following information :—

The total area of which possession was taken by the War Department for military purposes extended to 26,861 acres. In addition to this 4800 acres were purchased.

The Admiralty purchased during the war—mainly for use as Royal Naval Air Stations—a total of 6500 acres, and took temporary possession of a further 2000 acres.

The Air Ministry, who at the outbreak of war held by purchase or on lease 5180 acres, thereafter took over by requisition 33,427 acres and by purchase or on lease 16,980 acres. There was thus on 31st December 1945 held by the Ministry for R.A.F. purposes a total area of 55,587 acres.

These areas, comprising almost 95,750 acres, were removed entirely outwith the farmer's control. Other inroads upon his land were, however, necessary to meet military requirements.

A further call of a semi-permanent nature was made in preparation for D-day, when considerable schemes for military training were put into effect at Tarbatness and Culbin Sands. These involved a total of over 17,000 acres. The purpose was to provide immediate facilities for the training of all branches of the Service in the combined operations without which our assault on the Normandy beaches would have been impossible. It was necessary to clear the land completely of its human and animal population for a period of six months. The schemes were carried out by the

Government Departments concerned with great tact and by the occupiers who were unfortunately affected by them with much loyalty and a maximum degree of co-operation. The needs of the situation were recognised as urgent, and there can never before have been in the history of this country such a speedy and radical change in a rural district effected so smoothly and with so little complaint. It is worthy of note that the local Agricultural Executive Committees, under the advice and direction of Department Officers, gave on these occasions an impressive example of the results which can be obtained in harvesting, threshing, and the marketing of stock and crop by the marshalling and pooling of equipment and labour. The example is one not without future value to the farming community.

The War Department also exercised compulsory training rights over areas extending to no less than 6,650,000 acres—that is to say, about one-third of the total area of Scotland. On this land the farmer was, of course, allowed to continue his work, and, while the Orders applied to very considerable tracts of country, the normal practice was to attach an instruction to the effect that all land actually under crop was excluded. In many instances the land covered by these Orders was mountain or hill, and the inconvenience suffered by the farmer and the interruption of his work varied according to circumstances. There were instances of no small damage to fences and drains and of consequent mixing of stock. Both officers and men, however, showed upon the whole much consideration for the farmer's position, although it may be confessed that certain of the Allied troops were a good deal less mindful of private property than were our own men. Our interest, however, lies in the existence of the further obstacle which the exercise of these training rights put in the path of increased production. That obstacle was, on occasion, a considerable one, and, even on the roughest of hill land, it was found that a ewe, whose only previous experience of transport was of the humble bicycle, was never quite the same again after she had been faced with the apparition of a Churchill tank on her favourite grazing.

Enemy Action.—"He that is not in the wars, is not out of danger." Those who had an opportunity of visiting Kent during the war know the havoc which was wrought by enemy action and the grievous trials which were undergone by farmers there and in several other districts in the south of England. The interruption of agricultural work was almost continuous and was very great. We in Scotland suffered damage and inconvenience which was trifling by comparison. On occasions such as that of the Clydebank raid in March 1941, and in a sharp raid on Don side, serious damage was done to farm buildings, but, however distressing to those immediately concerned, the damage was insignificant when contrasted with that suffered in the south or with that which, indeed, at the outset of the war, most of us had confidently anticipated in Scotland. There can, therefore, be claimed for Scottish agriculturists an advantage in addition to those to which reference

has already been made—namely, that the enemy were not permitted to interrupt to any material extent the production of food on this side of the Border. That we were not entirely immune from enemy attention is shown by interesting information afforded to me by the Regional Manager of the War Damage Commission. When one looks back upon the comparative peace which we enjoyed throughout the war, it is somewhat surprising to learn that the number of claims, in respect of damage by enemy action to farm buildings in Scotland, was 561, and that the number of claims in respect of bomb craters in agricultural land was 468. Fortunately, most of the cases of damage to buildings were slight, and, as regards craters, we always had the satisfaction that if a bomb must fall it could not fall in a less dangerous or more convenient spot than in the middle of a field. In short, so far as the direct results of enemy action are concerned, and looking now at the country as a whole, it would be difficult to realise that Scotland was for five years an accessible target for a powerful and vicious enemy. The interruption caused by his action to agricultural work was in truth almost negligible.

The facts just recorded do not account for the whole decrease of 134,000 acres in the area of arable land shown by the Agricultural Returns between the years 1939 and 1944. Of this, as we have seen, the more permanent requirements of the Services accounted for over 95,000 acres. In addition, there was diverted from agriculture what in total must have been a substantial area necessary for war-time use by Government Departments, Civil Defence, and other Authorities. No precise information is available on this head.

Opencast Coal Working.—Then, during the latter years of the war a considerable acreage was absorbed by opencast coal working. Coal-mining and agriculture have always been poor bed-fellows. The results attained by the formidable organisation of men and machinery which has been built up for opencast working appeal to the amateur as falling far short of being an economic success. It is at least doubtful whether, in giving such over-riding priority to winning coal in this way, the Government have appreciated that the value of agricultural land is perennial, or have balanced the heavy costs of thus obtaining what is, in comparison with underground resources, a trifling quantity of coal against the loss of annual crop either permanently or over a necessarily long period of years. No statistics are available of the acreage of arable land thus put out of commission, but the inroads upon it have been substantial and peculiarly distressing to the farmer concerned.

As to the residue of arable land still to be accounted for, one surmises that the detailed inspection of farms both by the occupants and the Agricultural Executive Committees led to increased accuracy in the making of Agricultural Returns, and it would appear that the greater part of the "missing acreage" was transferred into the category of rough grazing. Doubtless, in the great majority of cases, this change was entirely justified by the facts, and there is little ground for the suggestion that it was sometimes

effected in order, on individual farms, to show a more satisfactory percentage of available land under crop !

Agricultural Practice in Relation to Increased Cropping.

The position in which the war found us as the result of long-established practice in the management of arable land is of critical importance in any consideration of the raw material for increased production with which Scottish farmers were provided. In 1939, of the total arable area, 31.7 per cent was in rotational grass. The corresponding figure for the United Kingdom as a whole was 13 per cent. These figures show the extent to which, in contrast with his English neighbour, the Scottish farmer has always taken the plough round his arable land, and reflect the system of ley-farming which is almost universally practised in the arable districts in this country.

The position in regard to permanent pasture—excluding rough grazings—brings out a similar contrast. In Scotland, permanent grass represented, in 1939, 35.7 per cent of the arable area, while in the United Kingdom as a whole the proportion was 59 per cent. The near equality between the areas of temporary and of permanent pastures in Scotland will be noted as being in strong contrast with the position in the United Kingdom where there was in permanent grass more than four and a half times the acreage in temporary leys.

These facts are stated not only because of their intrinsic interest, particularly in relation to the enthusiasm for short leys which now possesses our English friends, but more to our immediate purpose as reflecting the limitation placed by existing circumstances upon the ability in 1939 of the Scottish farmer to increase production, if increased production was to be measured by additional acres under the plough. He could and did, of course, raid his permanent pasture. He could and did intensify his cropping by restricting the acreage and shortening the normal life of his temporary pasture. But the proportion of his farm under permanent grass was relatively small, and on the remainder of his land he had for long been in the habit of putting every acre under crop in accordance with a recognised rotation. There was no 59 per cent of his farm in permanent pasture waiting to transform its accumulated fertility into food for the nation. Further, the extent to which he could reduce, for any lengthy period of war, his acreage of temporary pasture was restricted by the facts that that part of his holding had carried a crop a few years previously and that one cannot indefinitely punish land by successive and intensive cropping.

The statistical information which is now available shows how the results attained by farmers were dictated by the factors thus present in the position as it existed at the outbreak of war. By 1944 the proportion of permanent grass in Scotland had been decreased by 35 per cent, which approximates closely to the 37½ per

cent decrease applicable to the United Kingdom. Rotational grass had been *reduced* by $13\frac{1}{2}$ per cent in Scotland, in contrast to its *increase* in the country as a whole of 16 per cent. In short, the Scottish farmer was of necessity continuing in the main his rotational system of husbandry so far as cropping was concerned, while in England that system was being adopted under the necessity of resting the land periodically in temporary pasture.

It is against the background thus sketched that the effort of Scottish agriculture falls to be assessed. It is only against it that a proper evaluation can be made of such attempts as those made under the Marginal Land Scheme to wring an additional area for cropping from that miserable strip which in so many parts of the country "just divides the desert from the sown," or, with the help of the Hill Cattle Subsidy, to levy heavier toll on our rough grazings.

THE RESULTS ATTAINED.

The Production of Crop.

Keeping in view the limitations thus placed upon Scottish farmers by their established system of husbandry and by the loss of arable land devoted to other purposes during the war, we can now turn to the record of the manner in which the urgent task of increasing food production was tackled. On this matter the statistics given on page 58 may well be left to tell their own interesting and eloquent story. Indeed, any detailed comment upon that story would be out of place. There is no need to paint the lily. As a matter of interest, however, a word may be said of the success attained by the agriculturist on this side of the Border in comparison with that attained in the United Kingdom as a whole.

In Scotland the growth of essential food crops reached its peak in the fourth year of the war, and, although the tillage area devoted to these crops was maintained to a remarkable degree during the succeeding two years, the effort of the Scottish farmer can fairly be measured by contrasting the position in 1939 with that created in 1943. Between these two years the increase in Scotland of the area devoted to crops of which the nation stood most in need was one from 1,481,000 acres to 2,120,000 acres. This represents an increase of 43 per cent. The comparative figure for the United Kingdom as a whole is 65 per cent. The disparity between these figures is, of course, accounted for by the difference between the Scottish and English systems of husbandry which existed at the outbreak of war. A more accurate comparison is shown by the following facts. In 1939 the area under crop and fallow in the United Kingdom represented 28 per cent of the total area under crop and grass, excluding rough grazing. By 1943 the proportion had been raised to 47 per cent. In Scotland the proportion of crop and fallow to the total arable area in 1939 was $32\frac{1}{2}$ per cent, and this was by 1943 raised to 48 per cent. In short,

as we have already seen, the farmer south of the Border started off with a proportion of his land available for cropping substantially greater than that which existed in Scotland, but by 1943 on both sides of the Border agriculturists were running practically neck and neck in their efforts to attain maximum production.

It is always of interest thus to compare one's own efforts with those of one's neighbours, but the outstanding fact which appears from the figures is that, in answer to the nation's call in its hour of need, the agricultural industry responded in every part of the country in such a remarkable degree and with such outstanding success. It is, perhaps, little wonder that the farmer sometimes inclines to regard himself as in very much the position of Kipling's Tommy Atkins :—

"It's Tommy this an' Tommy that, an' 'Chuck him out, the brute!'
But it's 'Saviour of 'is country' when the guns begin to shoot."

Production of Specific Crops.—The necessary acreages to be devoted to particular crops were ensured partly through the price structure, but, in the main, by application through the Agricultural Executive Committees of the Government programme for ensuring what was most essential to the nation's food supply. Quotas of total tillage and of area of specific crops, such as wheat, potatoes, and sugar beet, were annually fixed for each Committee area. From an early period in the war each farmer was asked to have under crop a certain proportion of his arable land. That proportion varied according to circumstances. It was, for example, necessary for the dairy farmer to retain in grass an appropriate acreage for his stock. The percentage of tillage gave, however, a standard, useful alike to the farmer and to the Committee, by which to measure the effort demanded from each holding. Within the limits of total tillage an appropriate acreage under any specific crop such as potatoes, sugar beet or flax could be secured according to the circumstances of each individual farm. Working on these lines, Committees, in co-operation with the farmers, were remarkably successful in ensuring that their respective areas made due contribution to the national food supply.

Turning to the results thus attained in the production of specific crops we note the following interesting facts. The area under wheat in Scotland rose in 1943 by 114 per cent. The average in Scotland over the six years from 1940 to 1945 was 52½ per cent above the 1939 basic acreage. Scotland showed its ability to grow barley by affording an increase in 1943 of 114 per cent and in 1944 of 136 per cent, and an average increase over the war period of 72 per cent. Undoubtedly, as happened in a minor degree in the growing of sugar beet, our knowledge of the technique in growing barley advanced very considerably in the light of this experience, and we know considerably more now of the suitability of land for this crop and of its requirements in lime and manure than we previously did. The acreage under oats increased by about one-third and was remarkably level throughout the war. Potatoes were, of course, already extensively grown in Scotland,

but, in view of the vital need for this valuable food, they were increased in 1943 by 76 per cent, and the average increase over the war period was one of 57 per cent over 1939.

Crop Yields.—The estimated yields per acre of the principal crops and the estimated tonnage of these contributed by Scotland to the national larder are set out on pages 60-61. The figures are at least as striking as those of increased acreages, and, again, they may confidently be left to speak for themselves. Output per acre is the acid test of successful agriculture, just as output per man per acre may well prove to be the acid test of an economic industry. From this point of view both the Scottish farmer and the professional farm worker are entitled to look with satisfaction and with pride at the manner in which yield per acre was not only maintained but, in respect of all important crops, increased in the war years. If the ten-years' average from 1930 to 1939 is compared with that for 1935 to 1944, it is gratifying to find that, on thus substituting five years of war for five years of peace, there is actually an increase shown in the yield per acre of every one of the crops which were most valuable to the nation. The difficulties under which war-time farming was begun and carried on were very great. In the light of these this success in effecting such a high level of yield is one of the most remarkable features of arable agriculture during the war. It amply supports the contention, to which in too many quarters and too often a deaf ear has been turned, that the Scottish farmer, if given a fair chance, is capable of putting and maintaining agriculture on a very high level of efficiency.

Live Stock.

The circumstances affecting the live-stock farmer were very different from those affecting the arable farmer. The latter's effort, as we have seen, was devoted to an immediate and maximum increase of production so as to permit the nation as a whole to become, as nearly as might be, self-sufficient in respect of food supplies. It was early apparent that the duty of the live-stock farmer must be to make his individual holding as self-sufficient as possible and to do so under severe limitations caused by calls upon him to contribute from his arable acreage a due proportion of crop available for direct human consumption. At the root of this distinction between the functions of these two groups lay the fact that 100 acres of land devoted to the production of beef or mutton can maintain only 9 persons for a year, while the same area if devoted to wheat can maintain 210 persons, and to potatoes 420 persons. The problem which was thus set the Government and the live-stock farmer, and which had to be viewed against the background of shipping and imports, was solved in the only way possible.

As we shall see when we come to deal with the Animal Rationing Scheme, immediate and heavy reductions had to be effected in the number of pigs and poultry, while low-ground sheep had to

make way for crop. Similarly, available supplies did not permit of finishing beef cattle in the manner in which we were accustomed to do in Scotland. The demand was for weight rather than for quality. In these circumstances an inevitable and substantial decline resulted, particularly in the numbers of beef cattle, pigs, and poultry, but the fact remains that the population of such live stock was maintained at a remarkably high level despite the lack of imported rations on which, as we have seen, the farmer and small-holder had come to depend. Sir E. J. Russell calculates that an acre of land devoted to production of beef or mutton will yield 110 pounds deadweight, but that, in contrast, the acre, if devoted to milk production, will produce 300 gallons. The importance of milk as one of the most valuable foods in a beleaguered fortress was recognised at an early stage in the war, and high priority was given to milk production. There was consequently allocated to dairy herds a maximum proportion of available feeding-stuffs. In view of the importance thus attached to this branch of the industry, and of the fact that the problem of the dairy farmer included all the aspects of that which beset every live-stock farmer, it is appropriate to deal at some length with the position of the former. The subject holds the additional interest of being one of much practical importance in the future of agriculture in Scotland.

Milk Production.

The Statistical Table on page 71 is based on information given to me by the officials of the Scottish Milk Marketing Board. It covers the areas of the three Milk Marketing Schemes in Scotland. It excludes the figures for Moray and Banffshire, which were not, until late in the war, covered by any scheme, and also one or two smaller districts which were in the same position. These statistics show clearly the character of the problem which the dairy farmer set himself to solve and the success which attended his efforts. More detailed examination of the figures reflects in an interesting way the tendencies in milk production which characterised the different areas in Scotland. Under the Scottish Scheme summer production dropped by 2 million gallons during the first two summers of the war, but increased thereafter. By 1945, a million more gallons were produced than in the corresponding period of 1939. In contrast to these movements the area of the Aberdeen Scheme showed a steady increase over the war years from $4\frac{3}{4}$ million gallons in the summer of 1939 to nearly $6\frac{1}{2}$ million gallons in that of 1945, and a similar tendency was apparent in the area of the North of Scotland Scheme. Winter production, however, inevitably presented a more difficult problem. In the Scottish area there was a severe drop in production during the winter periods between 1939 and 1942. Thereafter, however, there was a steady recovery to 48 million gallons in 1944-45, and a complete recovery to pre-war level has been secured in the winter of 1945-46. In the areas of the Aberdeen and North of Scotland Schemes, although there was the characteristic

decrease in production in the winter of 1941-42, the drop in winter production was not so pronounced. A supply of 4·6 million gallons in 1939-40 was, in the Aberdeen area, raised to one of 5·4 million gallons in 1944-45, while in the Inverness area there was an increase from 981,000 to 1,218,000 gallons. It is well in considering these remarkable results to keep in view that during the war of 1914-18 milk production in Scotland dropped by 40 per cent.

How far then was this effort on the part of the dairy farmer successful in meeting the consumer's demand?

For an answer to that question one must look at the position in regard to the consumption of liquid milk. One of the main problems which caused concern in the area of the Scottish Scheme, and indeed one of the chief reasons why that scheme was established, was the heavy surplus for which there was no outlet in summer on the liquid market. Between the wars the Board had been most active in attempting to increase demand by the liquid consumer, and that demand had in fact risen from ·33 of a pint daily in 1935 to ·39 of a pint in 1938. During the war, however, milk came into its own as a food. Its value not only as a maintenance ration but as a health food was, in the severe absence of other commodities, at last recognised. Liquid consumption rose steadily until it is now ·66 of a pint per head of the non-agricultural population—that is to say, twice what it was in 1935. This corresponds closely to the experience in England, where it is anticipated that if supplies were unrestricted consumption would rise to three-quarters of a pint daily. The increase in Scottish liquid consumption is clearly shown in the Statistical Table, where it will be seen that in the areas of the three Boards there was a combined rise in liquid sales from 42½ million gallons in the summer of 1939 to over 64 million last summer, while in the corresponding winter periods the rise was from 41 million to 57 million gallons.

Notwithstanding the success which attended the efforts of the dairy farmer the ordinary consumer would say that milk during the war was in very short supply. Certainly his ration was often of meagre amount and well below what he was willing and anxious to purchase. In considering such a complaint, however, it is necessary to keep in view not only the substantial increase in the demand upon the liquid market, but the effect of the system instituted by the Government for priority-supply to certain groups of the population. The Milk in Schools Scheme started in November 1934 and rapidly expanded during the war. The National Milk Scheme which was instituted in June 1940 and afforded priority to mothers, infants, and young children, created a very heavy demand and one which, for example, in each of two successive years involved the withdrawal from the liquid market in favour of these priority consumers of 23½ million gallons of milk. Invalids also became entitled, on medical certificate, to a ration very considerably in excess of that allowed to the ordinary consumer. It is indeed estimated that the priority consumers enjoy first call on almost 60 per cent of the milk available for liquid consumption. Little wonder, therefore, that the ordinary consumer's milk ration,

while not very substantially below that which he had purchased in 1935, was much below what he desired in war-time. The fact of interest for our present purpose is that the dairy farmer succeeded so greatly in satisfying the demands of both classes of consumer.

Progress in Cleaning Up Dairy Herds.

In any appreciation of the success with which the dairy farmer thus tackled the very difficult job of not only maintaining but increasing production, it is well to note that coincident with this effort he made no less remarkable strides in improving the health of his herd and the resulting quality of the milk supply. When the Scottish Scheme was instituted in October 1935, 401 out of 8202 producers held licences for the production of graded milk. By October 1945 no fewer than 3472 producers out of 7910 had cleaned up their herds and were licensed for the production of Certified or T.T. milk. This effort is reflected in the increasing supplies of tubercle-free milk made available to the consumer. The quantity of such milk sold in the Scottish area during the year to 30th September 1939 was a little over 32½ million gallons. In the year to 30th September 1945 the quantity was almost 66 million gallons. No one with practical knowledge of the difficulties with which the dairy farmer and his workers were faced during the war will fail to appreciate the enterprise and energy which alone made such a marked improvement possible in the health of our dairy stock and in the soundness of our milk supply. Thanks to this war-time progress, the way seems now open to make certain areas in Scotland tubercle-free.

The Rationing of Animal Feeding-stuffs.

Prior to the war not only our dairy farmers, but every type of farmer engaged in stock-rearing had come to look upon home production rather as a supplement to the imported ration than as a mainstay of their rearing and feeding programme. As soon as war broke out they were faced with a very serious deficiency of animal feeding-stuffs, a deficiency which, in view of the preference which must inevitably be given to supplies which would occupy less room in a ship's hold, was certain to be during the whole course of the war a permanent factor in animal husbandry.

The pig-keeper and the poultry farmer were among the first to feel the full weight of the absence from the market of imported feeding-stuffs. They were heavily hit indeed, and, unfortunately, the immediate post-war situation is not to give them that relief for which we had hoped. It is convenient to round off here their war-time history so far as rationing is concerned. So early as November 1939 they were warned that they would, in 1940, be able to rely only upon two-thirds of the imported feeding-stuffs previously used. By the end of 1940 rations were made available

only for one-third of the pre-war head of stock, and exemptions were made only in respect of certain pedigreed or certified herds and flocks. This meagre allowance was soon to be reduced and, without entering into detail of temporary variations or of small additional rations allocated to farrowing sows and gilts or for the rearing of chicks, it may be said that during the war the pig and poultry-keeper received rations based on one-eighth of his 1939 stock.

The dairy farmer, however, also depended to a critical extent upon imported concentrates, although, since he had the backing of his farm, his dependence was not so exclusive or so complete as that of his neighbour who depended for his livelihood on poultry and pigs, which in many cases themselves occupied practically the whole of his small acreage. Further, in view of the value of milk as a food, the dairy farmer was early given a priority on such supplies of feeding-stuffs as were available. Notwithstanding this, his difficulties were great and were acute.

By the end of 1940 it was clear that it was no longer fair that such rations as were available should be left to be scrambled for or voluntarily allotted on the open market. Accordingly a Rationing Scheme was introduced on 1st February 1941. In Scotland the issue of coupons was undertaken by the Department, and the Agricultural Executive Committees were asked only to consider and recommend on the individual applications for supplementary rations. Basic rations for poultry and for pigs were issued direct by the Department without the intervention of the Committees. Accordingly, although the latter's duties were not light, they were nothing compared with the job of work which the Department undertook. Some idea of what devolved upon the Department can be formed from such facts as that during the period September 1942 to April 1943 they despatched to individual farmers coupons for pig and poultry rations which represented 22,300 tons, and, in addition, coupons marked "bran only" for cows and heifers representing 2800 tons. From October 1942 to April 1943 supplementary coupons representing 113,900 tons were issued in 300,000 cases. The justice with which the meagre supplies of animal feeding-stuffs which were available were thus distributed is most readily reflected in the comparative smoothness with which this very detailed and intricate scheme has been administered since 1941. There is nothing more distressing to a stock-keeper than to see his animals in want of sufficient or appropriate food or for a dairy farmer to know that another ton of concentrates is needed to maintain his output of milk. It is, therefore, certain that few circumstances existed during the war more apt to cause distress and irritation than the absence of necessary animal feeding-stuffs. The fact that complaints and displays of bad temper were singularly few in connection with the Rationing Scheme speaks volumes for the efficiency and equity with which the Department put the scheme in operation and kept it working.

While one pays tribute to the fairness with which available rations were thus distributed, there remains the fact that such

supplies formed only a small, although important, element in the success which attended the dairy farmer's efforts to maintain and increase milk production. That success in the main rested on the farmer's own efforts to feed his herd with the produce of his own holding. These were encouraged by advice and direction from time to time given by the Government and the Committees, although, in the circumstances, that advice had too often to take the form of a warning that there was worse to come. In 1941 the Department instituted a campaign, which was renewed in the winter of 1943-44, in favour of the making of silage, and, to encourage this, any crop grown for silage or for dried grass was credited to the farmer towards the tillage crop demanded of him. A similar campaign, which milk records still show to be essential, was conducted for the culling of herds. Action on these lines, however, was of relatively small effect compared with the steps taken by the producer himself to grow crops specially suited for his dairy herd. In 1939 the area under kale amounted to 8000 acres. This was increased to 14,000 in 1943. The acreage under cabbage, much of which was at last being recognised as a valuable contribution towards milk supply, rose from 4000 acres to 7000 in 1944. Beans for stock-feeding rose from 2000 acres in 1939 to 10,000 acres in 1943 and 1944, while vetches and tares were increased from 4000 acres in 1939 to 26,000 in 1943. A further fact which indirectly was of assistance to the dairy farmer should also be noted. The extraordinary extent to which the Army during this war was mechanised is, of course, a matter of general interest, and dictated the tactics and the conduct of every land campaign which was fought. In the result, although our cavalry and yeomanry regiments did magnificent work, they no longer did so on horseback. The demand for hay was therefore from 1939 to 1945 a mere tithe of what it was during any previous war. Further, the number of horses on Scottish farms gradually declined from 142,000 in 1939—in 1918 it had been 210,000—to 117,000 in 1945. In these circumstances hay, the area under which never during the war dropped below 480,000 acres, was available to a much greater extent than during previous national crises for cattle feeding.

The dairy farmer thus attained and has maintained a very high degree of self-sufficiency, and in this way made a notable contribution towards the release of shipping for other cargoes, every ton of which was of vital necessity in the conduct of the war. The results of his efforts have been so satisfactory that he is unlikely again to leave himself so entirely dependent as he previously was on purchased and imported rations for his herd. A decrease in yield was of course inevitable in view of the scarcity of feeding-stuffs, and it is estimated that that decrease was in the region of 70 gallons per milking head per annum. But in many quarters there is a feeling against going back to the old system of pressing the high quality cow beyond a certain point, and the war has proved that there are worse things for the cow, as for the human, than a plentiful supply of sound, home-produced food. The culling of the unthrifty cow and heifer which still finds

a place on too many farms leaves much scope for increased production and, along with a restraint in excessive feeding for high yields, would lead to an all-round improvement in the general standard and health as well as in the average yield of our dairy herds.

Sheep.

In view of the specialities attending the management and economy of hill-sheep farms, and the importance of that branch of the agricultural industry, it is appropriate to refer specially to the manner in which these farms fared during the war. The extent to which land had been laid down to grass between 1918 and 1939 naturally led to an increase in the number of sheep. The urgent need during the war for increased tillage involved two factors which had a direct bearing on the sheep population. In the first place, the low-ground flocks which had been established had to make way for crop. In the second place, the intake to the low ground of store lambs and cast sheep was substantially reduced. It is not surprising in these circumstances to find a reduction in the number of sheep and lambs from 8 millions in 1939 to 6½ millions in 1943. Winter storms and bad weather at lambing time contributed in several years to the decrease.

Under these conditions it was inevitable that the hill-sheep farmer, who had for some years previously experienced unsatisfactory returns, should find his position still further deteriorated. He was faced with rising costs without the advantage of the increased returns which the arable and dairy farmer enjoyed. Nor, in view of the enforced decrease in the demand for his stores, had he, pending readjustment of his system of management and of his market, the satisfaction of contributing greatly to the national effort. In these circumstances an attempt was made so early as the autumn and winter of 1939-40 to ease the position by advancing the price of light-weight ewe mutton. Some remedy of wider scope was, however, necessary, and on 12th December 1940 the Government announced a subsidy for the assistance of the hill farmer. Subsidy of half a crown became payable for each head of regular breeding stocks of hill-ewes kept under natural conditions and in accordance with the recognised practice of hill-sheep farming. The flock to be eligible must be of regular ages and must have lambed and reared the lambs on the hill. Subsidy was paid on the basis of the numbers shown in the Agricultural Return rendered in the previous December. Under the original terms of this scheme the Agricultural Committees certified and the Department of Agriculture met 16,255 claims, involving payment of about £285,000 in respect of just over 2½ million sheep. It is interesting to observe that consistently throughout the operation of the scheme Black-faced stock have represented 75 per cent of the total and Cheviots just over 20 per cent, while Shetland sheep, representing as they did the remaining 5 per cent of the total, are more numerous than the man in the street appreciates. Following on two severe winters

and springs, with consequent high death-rate and small crop of lambs, the subsidy was at the end of 1941 raised to 7s. 6d. for each eligible shearling ewe and gimmer. In the following May there was paid in respect of 15,483 applications a total of over £808,000. These claims represented a total of 2,144,182 sheep. In 1943 the subsidy was raised to 8s. per head and in 1944 reduced to 6s. per head, while it was again raised to 7s. 6d. in 1945. In 1944 the total amount paid was just over £700,000 in respect of about 2½ million sheep. In 1945 the total paid was £885,000. This was in respect of 16,800 applications covering 2,360,000 head of stock.

One feature of hill-sheep farming which was brought into existence by the war is worth noting as an illustration of the way in which agriculture adapted itself to the new conditions and because of the likelihood of its permanence. Whether a marketing scheme would, in view of the specialities of the trade, be helpful in marketing store sheep is a debatable question. It is, however, true that apart from disease the greatest difficulty with which the hill-sheep farmer was faced arose from the facts that his lambs and cast ewes had necessarily to be sold in the autumn and that they had to be sold off the great majority of hill farms as stores. The farmer was thus very much at the mercy of a very speculative market. As has been pointed out, one of the immediate effects of the war effort was seriously to reduce the area formerly available for feeding sheep. It was in these circumstances that many hill farmers turned to the adoption of means whereby they might fatten their stock on their own holdings. The increase of rape, from 3000 acres in 1918 to twelve times that area in the later years of the war, reflects one way in which the problem was tackled. Another was found by the improvement of hill pasture, and there was undoubtedly a striking advance made during the war in the management of such grass. It is perhaps unfortunate that, as experience has shown, rape does not in many districts and in many situations prove a satisfactory cover for seeds. Compensation, however, is found in the greatly improved technique in the laying down of permanent pasture and, possibly of more importance, in its subsequent management. It seems, therefore, probable that the hill-sheep farmer will not again allow himself to drift into the position of being forced to cash his one crop of the year in unfinished condition and as a matter of urgency in respect of the season.

Pedigreed Stock.

During several periods of the war those who had the interests of Scottish agriculture at heart felt much concern over the fate of our pedigree stock. Shortage of labour and feeding-stuffs, the complete cessation of overseas trade, and many other factors combined to make specially difficult the maintenance of pedigreed herds and flocks. The statistics with which Mr Alex. Sutherland of the 'Scottish Farmer' has kindly supplied me

and which appear on pages 66-68 show the success which attended the efforts of breeders to keep the flag flying. Post-war prices suggest, now that export is again possible, that the owners may reap a well-deserved reward for the enterprise and energy which kept this very valuable branch of the industry alive and active. Its value as a means of securing foreign currency by assisting our export trade is considerable, but one's main feeling is that of satisfaction that, notwithstanding the anxieties and difficulties which have been met, Scottish agriculture stands where she did in a sphere in which she has in the past been pre-eminent.

Prices and Financial Returns.

Before turning to a discussion of the tools with which the farmer was supplied in tackling his war-time job, it is appropriate to say something of the financial return which he received for his work. The matter is one of special interest, because it has now been made clear that the Government regard the agricultural price-structure as the main and most effective means of controlling agricultural production in the national interest.

The Price Structure.—On 2nd June 1940 the Government's agricultural policy was broadcast, and the announcement included the following statement: "It has been agreed that much the best and quickest way to get the increased food which the nation requires is to ensure that the farmer gets a decent price and, even more important, knows at once what he is going to get." From a very early stage in the war we became accustomed to a system of price regulation which, both in its scope and in its detail, embraced almost every commodity. Under this structure prices were fixed by the Government from producer right through to retail consumer, and the farmer was informed in advance of the price on which he could depend for his beef, mutton, milk, and crop. The system, allowing as it did for basing prices upon current costs of production, was administered with, upon the whole, great fairness and with a consequent degree of satisfaction to those primarily concerned. The Ministry of Food was the Government Department mainly concerned with agricultural commodities, and the only major complaint arose out of the failure on the part of the Ministry to apply timeously the important principle embodied in the broadcast—namely, that of letting the farmer know sufficiently in advance what price he could receive. On several occasions the long-term character of production was not appreciated, and one or two extraordinary proposals were made—such as that an additional quantity of milk would be made available if an increased price were paid in the month following the announcement. In view of the aftermath of the war which we are now experiencing, it is well to record any good result of our war-time experience, and there is no better result from the agricultural point of view than the adoption of the principle which now appears to be firmly established, namely, that information in regard to the prices to

be paid for his produce will be given to the farmer sufficiently in advance to enable him to lay his plans on as sound an economic foundation as is possible. Prices guaranteed on that footing and the assurance of a market together hold out a promise for agriculture which it has never previously enjoyed. It remains to be seen how far a guaranteed market, at guaranteed prices timeously announced, will dispense with the war-time necessity of direction to the farmer as to the production of specific crops.

It is unnecessary to deal in detail with the prices fixed for agricultural produce during the war. Sufficient particulars in regard to the more important items of interest are given on pages 62-65 of the statistical information. It remains only to say that the receipt of the prices which were fixed or were received in the open market, combined with an assured demand, afforded agriculture a measure of prosperity which it had not enjoyed for very many years. Upon the whole, the agricultural industry paid well during the war, although at no time were the profits permitted to reach what are now realised as having been the excessive, and in the long run damaging, proportions earned between 1914 and 1919. As has already been noted in so many different connections, the whole of our national economy was, during the recent war, under control from an early stage and in much greater detail than ever before in the history of the country.

Acreage Payments.—It is appropriate in dealing with the agricultural price structure to refer to one type of payment which was made directly by the Government to the farmer during the war, under the title of "acreage payments." Nothing will prevent the man in the street regarding these as an additional "subsidy" to farmers, but, in fact, the system was evolved in order to ensure that "pegging" of the retail price to the consumer, which was a main plank in the Government programme and which went so far to avoid creation of the vicious circle of rising wages, rising prices, and rising costs of living. The rates of acreage payment and the crops in respect of which they were made are shown on page 69. The manner in which the scheme operated may be illustrated from the case of potatoes. The retail price of ware was fixed by the Ministry of Food at a rate very similar to the pre-war price. On that basis appropriate prices were fixed to the wholesaler and in turn to the producer. The farmer, however, could not, in view of the costs involved, be expected to grow potatoes in return for this fixed price, and the difference between it and his cost was compensated by the acreage payment of £10 per acre. While such direct payment to the farmer by the Government was restricted to potatoes, wheat, and rye, one finds on occasion a failure to recognise that a similar system was applied in the case of other foods. Foods such as meat were purchased on the hoof direct by the Government, who were also, in effect, the sole purchasers of milk, butter, and the like. In the case of each of these food-stuffs the necessity of pegging the consumer's price required that the Government should fill a growing gap between the price paid to the producer for the product and the

price recovered from the consumer. The cost to the Government of filling such gaps during the current year is estimated at £318,500,000, of which £157,000,000 will be outlaid in respect of imported supplies, while £161,000,000 will be required to support the price structure in respect of home-grown supplies. It is perhaps in regard to the possible continuance of such heavy "hidden subsidies" that the farmer has most to fear in looking to the financial future of agriculture.

While, as has been stated, agricultural prices and a guaranteed market made the industry profitable during the war, it is highly relevant to inquire to what extent the farmer himself was allowed to retain the profits. The opportunity may be taken at the same time of recording shortly some of the other contributions by agriculture to the national effort.

The Farmer's Financial and other Contributions.—In no sphere was the farmer called upon more directly to shoulder a share of the communal burden than in the realm of taxation. The concise and interesting schedule prepared for me by Mr H. Murray, H.M. Inspector of Taxes, which appears on page 70, shows not only the heavy and increasing demands made in this respect upon the farmer between 1939 and 1945 but also the great contrast between his position during the war now ended and the position which obtained between 1914 and 1918. For the first time in history he was, to all intents and purposes, made subject to the same demands as the ordinary taxpayer. No concession was made to agriculture as such, and, as regards income tax and sur-tax, the farmer contributed precisely on the same basis of assessment on profit as did any other business man. The information concisely set forth in the schedule brings into prominence the following facts, which it is fair to bear in mind in considering the prices which the farmer received during the two periods. During the first war the farmer's position was as follows: he was consistently assessed to income tax on the basis of his farm rent, and it was not until 1918 that he paid on the basis of more than a single rent; the standard rate of income tax, starting in 1914 at 1s. 8d. per £ (yes, 1s. 8d. per £), rose to a maximum of a mere 6s. in the £; the exemption point was, in 1914, £160 and thereafter £130; and he was at no time liable to excess profits duty. By contrast the farmer during this war was, as early as 1941, made liable to income tax and sur-tax on his full profits, with the sole exception, apart from a temporary concession during 1941 in favour of the farmer whose rental did not exceed £300, that the man whose annual rent did not exceed £100 continued to be assessed on the basis of rental; even in his case profits were, in the absence of accounts, calculated at three times his rental; the standard rate of income tax, starting at 7s., rose in 1941 to, and remained at, 10s. per £; from 1941 the exemption point was reduced to £110; he paid sur-tax on the same basis as other business men; and from 1940 he was called upon to pay 100 per cent excess profits tax over a minimum standard of £1500, raised only in 1944 to £2500 and in 1945 to £3450. In the result, very

substantial contributions were paid by the farmer to the Exchequer, and it is to the credit of the agriculturist that at no time was there any evidence of the adoption, for this reason, of a "ca' canny" policy. Indeed, many prominent farmers increased or added to their holdings despite the knowledge that practically every penny of profit which they might thus make went directly to the Treasury. There is, of course, much to be said against any exemption of the agriculturist from the contribution which other business men are called upon to make to the Exchequer. It must, however, be recognised that the extent to which the farmer was from 1941 thrown open to the full blast of very heavy taxation bore with especial weight on the agricultural industry. There is no man who ploughs back profit into his business so consistently as does the farmer, or who must do so if his land is to achieve and maintain its maximum output. The sacrifice involved in the Revenue's demands thus affected him and his undertaking in a way not applicable in many other industries. Not only so, but the agricultural industry in 1939 was in parlous plight and, if it was to yield maximum production in the national interest, it required every penny of capital or accumulated profit which could be made available for the restoration and increase of the land's fertility. The nation might well have recognised that any concession granted to the industry during the war could fairly be regarded as the settlement of a debt incurred during the period of previous neglect of an essential industry on which we had once again to depend for survival. In these circumstances, even independent opinion now recognises that it was not in the best interests of the nation that farmers should have been taxed so heavily as they were. It is all the more to their credit that they loyally and consistently paid to the Exchequer such a substantial part of their hard-earned profits, and in this way made a substantial contribution towards the national effort quite outside their contribution in food. It is at least certain that if and when the hunt is up for war profiteers it will serve little purpose to cast the hounds into the agricultural coverts.

Any detailed account of the many-sided contribution to the war effort of Scottish landowners would be outwith the scope of this article. It is, however, appropriate to put on record here not only the valuable work done by many of them as chairmen or members of Agricultural Executive Committees, but, of more general importance, the whole-hearted manner in which they co-operated, seldom to their financial advantage, in assisting their tenants, in making available for cultivation policy parks and other valuable permanent pasture on their estates, and in readily sacrificing the beauty and amenity of many estate gardens in the interests of food production.

As regards other—and, since we are all human, more hearty—contributions made by the agriculturist towards the national effort, one must place on record the sterling work done by many landowners, farmers, and farm servants on civil defence and in

the L.D.V. and its successor, the Home Guard. Agricultural work is doubtless healthy, but it is also hard. To turn out to a Home Guard drill after a full day at the plough, on the hill, or in the byre, involved something approaching a feat of physical effort and endurance, but the duty was performed regularly with cheerfulness and no little enthusiasm in every district in Scotland. Although on occasion the Civil Defence were called to action, the military forces thus mustered and trained were, fortunately, never called upon to do battle. It is, however, true that, had it been otherwise, no section of them would have given a better account of themselves than the shepherds and other landworkers who know every inch of their countryside and who were well qualified physically and by training for the type of guerrilla warfare which they would have had to wage.

Turning again for a moment to finance, one records with some pride that among the voluntary contributions made by Scottish agriculture during the war none were more readily or more cheerfully contributed than those given, in cash and kind, for the benefit of the Scottish Red Cross Agriculture Fund, which was sponsored by the Highland and Agricultural Society. The "Red Cross Sale" was a great local event in very many areas, and its consistent success depended upon hard and enthusiastic effort on the part of local societies, auctioneers, and other voluntary workers throughout the country, and upon the generous response of the local landlords and farmers and of the public. For the good of the cause all set aside too close inquiry as to intrinsic value when bidding for the attractive produce and stock which was invariably offered. A total of no less than £762,525 was thus raised in five years, and that the enthusiasm and generosity increased, rather than waned, is shown by the fact that over £213,000 was contributed in the fifth year of the Fund.

THE TOOLS.

Having surveyed the job to which agriculture was called and the manner in which the job was accomplished, we now turn to an account of the tools with which the farmer was supplied. Weather and labour are probably the most important of these, and it is right that the position in regard to the latter should be described in some detail. Thereafter a short account may be given of the chief forms of assistance given by the Government to the farmer.

WEATHER.

The Highland and Agricultural Society has shown, for many years now, a sound appreciation of the all-important bearing which the weather has on farming operations. As early as in the volume of 'Transactions' for 1853-55 Sir John Stuart Forbes of Pitsligo dealt with "Agricultural Meteorology." An article on the weather

of the previous year has now been published annually over a period of sixty-five years. From 1880 to 1907 this unbroken series of weather reports appeared under the title "Meteorology of the Year." The later series consists of annual articles under the less resounding title of "The Weather of Scotland." The existence of these valuable records makes it possible to deal with the matter here much more shortly than would otherwise be justified and necessary.

One's interest is, of course, rather in the weather which we are to experience in the future than in that which we have "enjoyed" in the past, but I suggest that the reader will find it very illuminating to refer to the articles which appeared in the 'Transactions' from 1939 to 1945. In his perusal of these he will appreciate more clearly than is possible in any other way the extremes of weather with which Scottish agriculture had to contend during the war, and will be able to recollect in tranquillity the varying fortunes which in that respect the Scottish farm worker and his employer had to face.

It would, however, be doing scant justice to the farmer and his staff if one omitted from this survey some more detailed reference to a factor which plays such a great part in the success and failure which attend their efforts. Such a reference is rendered specially advisable because, undoubtedly, the townsman often fails to appreciate the bearing of weather upon agricultural production, or even the very character of the weather which he himself is experiencing. So long as the suburban dweller escapes rain on his daily journey to and from the city, and on his recreational Saturday afternoons and Sundays, he is apt to consider that the weather is good. He has difficulty in appreciating that the rain, which has fallen overnight or during his hours at the office desk or factory bench, may have completely stopped ploughing, sowing, or harvesting, despite the sunshine which he himself has experienced when out of doors. What kind of weather then did the Scottish farmer experience during the war? Conditions in this respect, of course, varied from locality to locality and even from farm to farm, but, looking at the country generally, weather conditions during the war were on many occasions and during critical seasons quite exceptionally extreme. The following examples are culled at random from the articles already referred to and from the 'Scottish Journal.' November 1939 was the wettest November for over forty years. November 1944 was, with that exception, the wettest November for over fifty years and was the coldest for twenty-five years. In that month Edinburgh experienced the heaviest rainfall for a hundred years. February 1942 was the coldest since 1900, while February 1943 was the mildest for forty years, and February 1944 the driest for ten years. The all-important month of April excelled itself during the war years. Thus in 1942 Kilmarnock—which is not exactly famed for the absence of rain—experienced a thirty-four-days' drought, which lasted from 11th April to 14th May. April 1943 was the mildest on record, while April 1944 was characterised by exceptional frost at its start and exceptional rain

in the latter part. As for the harvest weather, possibly those who had practical experience of it feel that, upon the whole, the least said about it the better. None of them will readily forget the harvesting of lodged crops in 1942 and 1943, or the heart-breaking harvest of 1944. August 1943 was the most persistently wet since 1930. In the Lothians September 1944 was the wettest September in seventy years, with the sole exception of 1927. Over the country as a whole October followed with rain on one day in every three.

Nor was it only the arable farmer who had to face extremes of weather such as these. The sheep farmer, during the first three years of the war, had to cope with winters which were exceptionally cold and stormy and during which the bad weather lasted well into the spring. The blizzards of the winter 1941-42 and the May blizzard in 1943 were remarkable for their severity, and it took some years before the depleted stocks recovered from the heavy losses then sustained.

These illustrations suffice to bring into clear relief the enormous and special difficulties created by conditions over which he had no control for the man who, with a depleted staff, was being called upon for increased cropping. The farmer's success in food production depends in critical degree upon his ability, with the labour and equipment available to him, to cope with each phase of his work timeously so that ploughing does not overlap into sowing, turnip-singling into hay-making, hay-making into the grain-harvest, or the grain-harvest into the potato-harvest. When one keeps in view the adverse conditions which were experienced just when the farmer was being called upon for maximum effort, it is noteworthy that he should have tackled so successfully such extremes of weather as we have instanced and should have refused to be discouraged in facing responsibilities which increased from year to year as the war continued. It is well to read the statistics of steady increases in tillage and of remarkable crop yields in the light of these facts.

It is somewhat surprising to find that, notwithstanding the extremes of weather during the war years, the yield of crop was well above the average and was, for example in 1942, quite exceptionally high. The fact indeed is that, despite the extreme weather which was experienced, the seasons as a whole were good for growth and that, thanks to the efforts of the agricultural workers, the heavy harvests were secured with much less loss and damage than seemed likely. Undoubtedly also we were privileged to enjoy, on the whole, specially favourable weather in the month of March during the war years. This enabled early seeding with remarkably good results, to which generous manuring and application of lime, rendered possible by the farmer's improved finances, made a further substantial contribution.

An interesting experiment was tried during the war by the Department of Agriculture in co-operation with the Service Meteorological Offices with a view to warning the farmer of the weather which he was likely to meet. Every evening during the harvest

season there came over the telephone from the Department to each Agricultural Executive Committee such cryptic messages as "Trouble, Berwick, sell Cow," or, "Trouble, Angus, fat Pig." The choice of the introductory code word, "Trouble," suggests that the author was a practical farmer in one of our wetter districts. The interpretation of the first message was that Berwickshire farmers might anticipate that the weather would probably continue bad or poor and that the morrow's weather was uncertain. The second message warned Angus that there would be appreciable rain during the following day and that the weather thereafter could not be foreseen. In these days of air-raids, weather was, of course, a "top secret," but the scheme in this way put nightly into the hands of the Executive Committee staff the best information available as to the weather prospects for the following day, and they were authorised to communicate that information to any farmer who was interested. The scheme showed commendable enterprise. Almost inevitably, however, it proved of insufficient value to justify the elaborate arrangements which were involved. It is not practicable to pin-point a weather forecast to a particular farm, and the individual farmer could not rely sufficiently upon the forecast to justify any change of plans already laid for the following day's work. In these circumstances the position in regard to the scheme was fairly summed up in the remark of a Border farmer who said, "I'm no' saying that the thing hasna' been worth a trial, but, for masel', I find I'm better just to depend on ma ain o'e and the wife's rheumatics."

LABOUR.

The prime necessity of the farmer, next in importance to reasonably good weather, is that of essential labour. Without suitable weather and without adequate staff his "land will lie ley." In describing the position of agricultural labour during the war I have in mind the continued importance of that factor, and I think it of interest to treat, at somewhat greater length, matters which, as in its case, raise problems of permanent importance to the industry.

Prior to the war one of the most serious problems facing not only agriculture, but our country as a whole, was the drift from the rural areas to the town, and, in particular, from farming to urban employment. While by 1939 the number of agricultural male workers of twenty-one years and over had declined, as compared with 1921, by only 4 per cent, the number of males under twenty-one years—that is to say, of the younger generation—had declined by no less than 20 per cent, and that of females by 34 per cent. Part of this decrease was, of course, occasioned by the smaller demand for the worker's service in view of the decline in tillage area, but the chief cause was the fact that agriculture had ceased to attract the younger people. The result, in face of the urgent need of increased production in 1939, was, to say the least,

discouraging. A full account of how the barrel was scraped for labour necessary to increase home-production, of the very varied sources which were tapped for essential help, and of the response to the call for work on the land, would occupy much greater space than is available here. In limiting the story to a bare outline I do so from no lack of appreciation for the efforts of the professional and amateur workers. Their contribution was of critical importance to the industry, and was one of the main decisive factors in the success which attended its efforts.

The Skilled Regular Worker.

The character of the labour problem which faced us throughout the war appears most clearly from a consideration of the position in regard to the supply of regular farm workers. The number of males of twenty-one years and over in 1939 was 56,674. That number dropped in 1940 by over 1400. During the succeeding two years it gradually rose, until in 1942 it was practically at the same level as at the beginning of the war. Thereafter it maintained a level of over 56,000. Inevitably, the record in the case of males of eighteen to twenty-one-year olds was not satisfactory from the agricultural point of view. Their number dropped by 1060 in 1940, and, although there was a slight rise thereafter, never again attained the 1939 level. On the other hand, subject to a decrease in 1942 as compared with the previous year, the number of males under eighteen years of age increased until in 1944 it exceeded by about 1000 the pre-war number.

To appreciate the bearing of these figures it is necessary to bring the size of the regular labour force thus available into relation with the size of the job. It was a favourite recreation among old soldiers in 1920 to attempt to answer the question, "Who won the war?" It would be an invidious task to attempt to answer that question as it applied to Scottish agriculture during this war, but there is complete unanimity in saying that the burden of increased production was borne to a very large extent by the skilled farm workers and, among them, by the older and most experienced men. It has always been true that the most essential factor in the sound management of land is the experienced ploughman, the experienced dairyman and cattleman, or the experienced shepherd. Certainly no tribute can be too high to the part played by such men during the war. When, accordingly, we find that at no time between 1939 and 1945 was the number of the older skilled men so great as it had been at the outbreak of war and that in the immediately younger group the number was consistently and substantially below the pre-war figure, and when we relate these facts to the war-time increases of 43 per cent in the area under crop and of 82,000 head in our dairy herds, one appreciates at its full value the burden of responsibility and work borne by the professional farm workers.

Enlistment during the War.

In 1939 there was not that heavy enlistment in the Armed Forces which was witnessed in 1914. Doubtless in certain country districts the mechanisation of the yeomanry regiments had its effect in lessening local enthusiasm for the Territorial Army. There were still, however, rural areas in which local Territorial Units enjoyed a great measure of support and from which mobilisation at once withdrew a considerable number of agricultural workers from the land. From many of our crofting areas also, Naval and other Reservists were called to the colours in considerable numbers. The number who thus left agriculture was not, however, great in comparison with the total number engaged in the industry. Further, apart from this original drain upon labour resources, the war was, from an early date, recognised as one calling for a planned effort inconsistent with open recruiting by the Armed Forces from essential industry. Priority was very properly given to the demands of agriculture, although there was a constant sifting throughout the war of all cases in which agricultural workers were reserved. The attitude towards these workers is reflected in the fact that their calling-up was consistently regarded as "deferred," and exemption from military service, with which we were familiar during the last war, was practically unknown. It is estimated that, as the result of the original exodus of Territorials and Reservists, the exercise of the option given even to agricultural workers to join certain branches of the Navy and Air Force, and the regular and continuous scrutiny of deferred cases, the Services drew from the main agricultural occupations between 3rd September 1939 and January 1946 a total of 6500 men of all ages.

The Need for Additional Labour.

In face of the depleted labour force which was available in 1939, it was essential that additional workers must be found. The difficulties with which the farmer and the authorities were thus faced were enormous. The nation was mobilised for war to an extent never before known in its history. There was a great and increasing demand from each of the Services for additional numbers both of men and of women. Every war industry was clamouring for extra hands, and the Civil Service was growing apace. Agriculture had for long been the Cinderella among national industries, and it is true that in certain respects during the war that attitude not only showed itself but prevailed in the inevitable conflict of claims between different Government Departments. In regard to labour, however, agriculture was able to peg out a claim to a fair share of such labour as was available, and, to a considerable extent, to retain such labour as could be recruited.

The Women's Land Army.

What, then, were the sources from which we drew the supplementary labour which was essential? Of these it is only courteous to record that the Women's Land Army early established itself, and thereafter fully maintained itself, as the chief new element in the ranks of the regular farm worker. Prior to September 1939 arrangements for its recruitment and administration had already been made, and the number of its members regularly employed rose from 110 in that year to a peak figure of 8250 during the 1943 harvest, with 7685 still fully employed at the end of that year. Forestry is outwith the scope of this article, but it is worthy of record that, in a special branch of the Land Army devoted to that work, there were as many as 1500 girls employed, in addition to those mentioned here. The Land Girls were drawn from every quarter of Scotland and from every kind of pre-war employment. It is needless to pretend that, at the outset, they were looked upon as adequate substitutes for the skilled male worker. Indeed, during the winter of 1940-41, owing to the poor reception given to this type of labour, almost 450 girls who had already been trained left the Land Army for other employment in which their desire to pull their full weight in the war effort would be appreciated. The Land Girls soon, however, established for themselves a reputation for adaptability and for downright hard work, which formed the best advertisement for their skill and conscientiousness and the best reply to the criticism with which they were at first met. The demand for their help was such that, by May 1941, 950 of them were in regular employment; 100 were training on farms; 80 were undergoing training at Agricultural College farms; and the accepted recruits awaiting training numbered 350. The popularity of land work as a form of national service was also growing. Due to this cause, coupled with the passing of compulsory measures for the registration of women for employment, applications for entry to the Land Army were coming in at the rate of nearly 600 a month. The most adequate testimonial which can be given to the members of the Women's Land Army consists in the fact that their numbers rose as they did and that, after a comparatively short apprenticeship on their part, the demand for their labour steadily increased so that, on very many farms throughout Scotland, their departure was deeply regretted by those with whom they were associated in the good work which they accomplished.

As a matter of future as well as of past interest, the following facts may be recorded. As was inevitable in the circumstances, there was a considerable wastage in the numbers employed in the Land Army. It proved impossible for many of its members, with the best will in the world, to stand up to the hard physical labour, to the long hours, and to the extremes of weather which are all involved in agricultural work. Thus we find that by May 1942 there had been 1400 resignations or dismissals among those who

had been placed in training or in employment. In effect, almost one in every three of the girls accepted and trained at State expense either resigned or was dismissed. This suggests that, in the interests both of the service and of the girls, a better system for the rejection of misfits at the outset might well be adopted in any future scheme of the kind.

The great majority of Land Girls were quartered on the farms on which they were individually employed, and, for example, at the end of 1942 about 80 per cent were thus placed. For the most part the remainder were housed in hostels and worked under the direction of the local Agricultural Executive Committees, singly or in gangs, wherever there was a call for their services. The hostels in the end numbered about 115, with accommodation for 2583 girls.

The future of the Land Army is still in the balance. By the end of 1945 its numbers were almost 2500 fewer than at the end of 1944. There was no intention on the part of many of its members to take up agriculture as a career. Others, however, have developed a love of the land which has decided them to continue the work, and some are taking advantage of the opportunities of technical training offered by the Government. All that one can say meantime is that it is difficult to contemplate a situation in which there will not be ample room in agriculture for girls of their type, and that those who did serve in the Land Army put agriculture during the war under a heavy debt of gratitude for their good work.

Other Women Workers.

The assistance rendered by women to the farmer during the war was by no means confined to that afforded by the Women's Land Army. After 1939 the number of women and girls regularly employed in agriculture rose from 14,379 to 27,261 in 1943, and similarly the number of those casually employed rose from 5835 to 10,420 in the same year. This increase would have been impossible if it had not been for the loyal response of women and girls in every district to the call for help on the land, and credit is due to those who thus volunteered for essential service while realising they were not in a position to enjoy the status of embodiment in a regular Government service, or to enjoy the glamour of a Service uniform. It is certain that without the help of hundreds of women and girls from towns and villages and from farm cottages the work of dairying, tending stock, thinning turnips, hoeing potatoes, and harvesting crop could not have been accomplished.

School Children.

The source of additional labour which occurs to one as having precedence next after the women volunteers is the School. The tradition of the "potato holiday" is of long standing in Scotland,

and the area under potatoes rose steadily from 134,000 acres in 1939 to 239,000 in 1944. Not only so, but the crop was one of special value as one of the most important elements in the national diet. In order to secure the help of the school children in gathering the crop Education Authorities throughout the country co-operated loyally with the local Agricultural Executive Committees. School holidays were adjusted to coincide with the potato harvest. Transport to the fields, requiring at peak periods the employment of over 400 buses, was arranged where necessary, and children from outside areas were accommodated in hostels. In making and carrying out these arrangements the teachers gave excellent service, and a heavy weight of responsibility was thrown on the shoulders of them and of the local Committees' Labour Organisers. In the result, many thousands of school children helped in harvesting this specially valuable crop. Precise numbers are not at first available owing to the various arrangements which were at first made for local engagement by individual farmers, but after 1942 experience showed the necessity of organising the work more thoroughly. The size of the labour force which was then utilised and the value of the help which was thus afforded are shown by the fact that the number of school children employed locally was 44,000 in 1943 and 45,000 in the following year. In addition, in the latter year, 10,500 children were transported daily from the towns, and almost 6000 from the larger cities were billeted in localities where the need was greatest.

School children of older ages also rendered service in harvesting the grain and fruit. The cities sent cheerful and willing groups, mainly of the older girls, to pick fruit; and we find for example in 1943 that 2593 senior school girls were thus employed in Perth, Angus, and Fife. In the following year the number had risen to practically 3000, accommodated in 53 hostels in these counties. The senior boys gave similar good service, particularly on the grain harvest. Over 3000 senior scholars volunteered for holiday work of this kind in 1943, many of them being billeted individually on farms, while others worked either from their own homes or from hostels. Many schools in Scotland in this way provided from among their senior boys groups who, with their masters, annually gave valuable help.

Other Volunteers.

The pressing need for help, particularly during harvest, could not, however, be met adequately from the sources already described. The help of students, industrial workers, Civil Servants, office workers and others was enlisted, and, although the quality of this labour varied greatly, the response to the appeals which were annually issued by the Department of Agriculture was generous. Thus in 1944 we find no fewer than 9220 men and women doing their utmost to assist in gathering a grain harvest which in that year covered over 1,400,000 acres. Apart from a number placed individually on farms, these volunteers were placed in hostels,

of which nearly 200 were established by the Agricultural Executive Committees, and from which the volunteers were organised in gangs travelling to the job on foot, by bicycle, or in motor transport, according to the distance from the quarters.

The Services.

The help of British and Allied Forces stationed in this country was also of great value. The assistance rendered was often of a purely voluntary character, and the men themselves received no cash payment from the farmer. The supply inevitably varied according to the military situation, and, while such operations as the landings in North Africa and Normandy were being prepared and followed up, it was impossible to release troops for agricultural work. Prior to and between these events, however, there was no form of help which the farmer appreciated more. Added to this, a system whereby men previously engaged in agricultural work were released for periods of twenty-eight days during harvest was put in operation and proved very useful as well as a popular break for the men themselves.

Prisoners of War.

In view of the somewhat precarious character of the Services as a source of labour, it was well that they themselves secured for the farmer substitutes in a position to give more regular service. In 1942 Italian prisoners of war began to arrive from North Africa and later from Italy itself, and what must be regarded as a generous allocation of these men was made to agriculture. After D-Day German prisoners were available and have since gradually substituted the Italians on the latter's repatriation. By the end of 1942 the number of prisoners of war available for farm work was 3000. This rose rapidly in 1943 to 8700, and again in 1944 to 11,100. By the end of 1945 the force numbered over 19,000.

Reports as to the quality of the service rendered by Italian prisoners vary greatly. Those who, after serving an apprenticeship of work from prisoner-of-war camps, were billeted and employed on individual farms appreciated their good fortune and, upon the whole, worked well. Many of the others did likewise, but the fact is that the British farmer has never been a hard driver and is constitutionally unable to employ anything which he regards as slave labour. Not only so, but it must be confessed that he shared with his brothers in the Armed Forces the amused contempt with which the Italian soldier came to be regarded. In the result, the Italian prisoner tended to take advantage of the farmer's good nature, and indeed indulged from an early date in a mild form of blackmail, demanding perquisites and food in return for a reasonable day's work. The perquisites thus demanded got so far as to include hair oil. The position created much difficulty

for the Military Authorities, and it was well for the farmer that their contravention of the Regulations was often treated sympathetically. On the whole, however, the Italians did good service, and at least formed a pool of labour without which the work actually done on the farms could not have been carried out. When the German prisoners arrived they were found to be better disciplined and harder workers, and, so long as they were accompanied by their own N.C.O.s, have given more universal satisfaction.

Irish Workers.

A substantial number of workers from Eire were brought in to assist in augmenting the labour pool. Many of these men did good work, not least on drainage jobs. The only pity was that the control exercised over them by the authorities was lax, and many Irishmen wandered from farm to farm, wherever the highest wage was offered. Individual farmers were themselves greatly to blame for thus creating a type of worker liable at a moment's notice to enlist with the highest bidder. Surely in future some co-operation on a matter of this kind can be enforced and some arrangement made whereby Irishmen earning British wages shall be liable at least to pay British income tax.

Organising the Labour Force.

The task of securing supplementary workers fell upon the Labour Branch of the Department of Agriculture, in close liaison with the Ministry of Labour, while the Labour Branch and the local Agricultural Executive Committees were charged with the organisation and distribution of the available supplies. The Committees in 1941 appointed Labour Organisers who, with their assistants, thereafter carried out an anxious and difficult task with energy and no little tact. That the Department and the Committees did an excellent administrative job is beyond doubt. The varied character of the labour, the numbers which were recruited and allocated, and the success with which increasing and heavy crops were husbanded and secured, amply support that claim.

Certain Defects Apparent during the War.

The agricultural industry is almost unique in respect that its product requires to be secured at a definite time of the year, and the more highly mechanised cultivation becomes the greater is the need for supplementary labour at certain seasons. Thus the work of harvesting increasingly requires a labour force much in excess of that which can be economically employed by the industry throughout the remainder of the year. There will, for this reason, always be a demand by agriculture for labour which

is at once not only casual but also seasonal. Notwithstanding the cessation of the war, therefore, the problem of the sources and organisation of that labour remains, and there are many who cannot foresee an efficient and prosperous agriculture in this country unless the Government will undertake some continued responsibility in the solution of that problem. If, therefore, some form of Government organisation for the supply of supplementary labour to agriculture is to be contemplated, it is well to put on record at least two defects which appeared in the arrangements made to that end during the war.

In the first place, in various ways and at various times there was a failure to appreciate the fundamental fact that an efficient industry is coming more and more to depend upon an effective output per man. On several occasions there were signs of a failure to appreciate this fact on the part both of the Labour Branch of the Department and of Agricultural Executive Committees. It was inevitable that the quality of the available seasonal labour should not have been high, but that cannot be recognised as an excuse for accepting numbers as the test of the adequacy of supply or for accepting a standard of work which, in relation to the cash return demanded for it, is unsatisfactory. In any future Government organisation for the supply of agricultural labour these features of war-time administration must be kept in view. All agricultural work, no matter how apparently simple it is, calls for a certain degree of skill. It invariably also calls for a fairly high degree of physical strength. It is well, therefore, to remember always that quality and quantity together form the only fair or reasonable test for the adequacy of supply of farm labour.

A further comment on the arrangements made by the Government for the supply of harvest requirements seems justified. There was evidence during the war of what must be described as an error in psychology on the part of the Government in many of the appeals which were issued for volunteers. There was a tendency to suggest that the volunteer could fairly regard this war job as equivalent to a *holiday*, and that attitude was on occasion inevitably reflected in the behaviour of those who offered their services. There is no joy more satisfying than that of the farmer who sees a crop well won. Such joy is only attained, however, after much anxiety and hard work, and often after experiencing considerable physical discomfort owing to the exigencies of the weather. No one who has heuched and housed turnips in wintry weather would regard himself as enjoying a "holiday." In these circumstances it is suggested that it would be sounder psychology in any appeal for voluntary work on the farm to be perfectly frank as to the hard character of that work and of the discomforts which may well attend it. Approaching it in this way the volunteer would not, as so often happened during the war, realise too late his or her own physical inability for the job, or be discouraged at its outset. It is much to the credit of many men and women and of many young people who lent their aid to agriculture during the war that, after surmounting much disappointment at the contrast

between the somewhat glowing terms in which the official literature and appeals described the work, they settled down to the actual situation with no little courage and determination, and in consequence were able to render an essential service to the nation in its time of need.

Conditions of Employment and Wages.

Stand-Still Order.—The Scottish farm worker has for many years proceeded on the footing that “changes are lightsome,” and on country roads a common sight on the 28th of May or the 28th of November was the cart or lorry laden with the worldly possessions of the man who was “flitting.” It was clear that the freedom and practice of thus changing employment were inconsistent with the critical need to allocate effectively the skilled agricultural labour which was in such short supply during the war. For the same reason the employer could not be permitted to dispense with such skilled labour as he had except on very good grounds. Further, the competition of other industries and civilian services, many of which offered high wages, made it essential to stop the inevitable drift of farm workers to other employment. The Undertakings (Restrictions of Engagement) Order was passed in June 1940 in order to stop this leakage. It did not, however, prevent movement of the workers within the industry, and, in the circumstances which have been described, it was necessary to pass the Essential Works (Agriculture) (Scotland) Order, 1941. This Order, commonly known as the “Stand-still Order,” came into force on 1st November of that year and was applicable to male workers of sixteen years and over. It continued in force throughout the war, and by this means it was ensured that neither farmer nor worker could terminate an existing contract of service without the approval of the National Service Officer or of the Tribunal which was set up to deal with appeals from that Officer’s decision. It also made certain that no farmer could increase his staff, or fill any vacancy which occurred in an existing staff, without similar approval. As the main purpose of the Order was to ensure the most effective distribution of the existing supply of labour, the fund of information available to the local Agricultural Executive Committee was at the disposal of the National Service Officer in dealing with applications, but the decision was, very properly, arrived at on the independent judgment of the latter. It is right to record that, notwithstanding the serious departure from old habits and the limitations of personal liberty which these Orders effected, the war-time restrictions were, in the very great majority of cases, loyally accepted by both parties, and that the National Service Officers discharged a difficult duty with competence and fairness. Under the Stand-still Order an option was still open to the employee of leaving his job to enter the employment of his local Agricultural Executive Committee. The fact, however, that that Committee was necessarily empowered to place men thus coming into their employment wherever there was most

need for their services made the exercise of the option somewhat of a lottery. In fact, there were comparatively few cases in which advantage was taken of the provision.

Wages.—The labourer is worthy of his hire, and, particularly in view of the restriction put upon his choice of employment, it was just that his wages should at least bear fair comparison with those which he could secure in other industries. The District Committees established under the 1937 Act had, by the summer of 1938, completed their task of fixing minimum wages for the first time. In September 1939 the minimum wage of the older ploughman, who may be taken as a typical example, was, according to district, from 34s. 6d. to 40s. per week. This included the value of house and perquisites. In March 1940 the ploughman's minimum wage was advanced by 10 per cent, and later in that year the minimum wages of male workers were raised to 48s. per week for any worker over twenty years of age, and from 52s. to 58s. per week for specialists such as ploughmen, stockmen, or grieves. On 19th January 1942 a further rise of approximately 25 per cent was granted. The new minimum wage for the male adult worker became 60s., with adult ploughmen at 65s. Rates were still further increased on 29th March 1944, and again on 16th April 1945, when the ploughman's minimum wage became 76s. In May 1944, after various increases during the previous war years from weekly rates of about 21s. 6d. per week in 1939, a uniform scale for women workers of 47s. was fixed, with an additional 6s. for stockwomen. Meantime, a change in the administrative system of fixing wages had been made by Defence Regulation passed on 24th March 1944. Previous to that date the initiative in fixing wages rested with the District Committees, whose recommendations were passed to the Board. The Regulation provided that both preliminary consideration and final decision would rest with the latter. The province of the District Committees was restricted to a right to be consulted by, and to represent and to make recommendations to, the Board. The period during which this Regulation was to operate was in express terms limited to that during which agricultural prices are fixed on a national basis and during which a market for agricultural produce is assured to the farmer.

Hours.—The hours of labour were, and still are, left for settlement by agreement between employer and worker. Wages Regulations affect this matter only, as it were, indirectly. The minimum wage is paid for a certain total number of hours worked per week on certain days of the week. Work done outwith these prescribed hours must be paid for at fixed rates of overtime. The resulting lack of elasticity in this system is obvious, particularly in its application to the special conditions of an industry such as agriculture, and is not satisfactory to any of the parties concerned. That fact, however, presented little difficulty during the war when, under the pressure of the national crisis, farmers and workers alike showed commendable concern rather that the job should be done than that they "should work to the clock."

GOVERNMENT TRACTOR SERVICE.

In considering the "tools" with which agriculture was supplied for its war-time job, it is interesting next to give some account of one which was itself operated by the Government, and in the operation of which the Civil Servant had to get down to practical agricultural work on the farmer's behalf.

The service was brought into operation on 3rd November 1939. Its history was one of steady growth and of great usefulness in enabling progress to be made in the big task to which agriculture was called. Because of its interest as a novel and striking factor in Scottish agriculture during the war, and because it is still an open question whether some service of the kind cannot play a necessary and useful part in post-war agriculture, it has been thought well to give on pages 72-73 a record not only of the work actually accomplished, but of the full equipment with which, in answer to demands by the farmers themselves, it was found necessary to furnish this Government undertaking.

The niche which the service was meant to fill can be accurately appreciated from the fact that in such official publications as the 'Scottish Journal of Agriculture' the service was consistently referred to as the "Government Tractor Reserve." From the outset there was no intention that it should replace the facilities which existed, or came to exist, on any farm or in any area for carrying out agricultural work. As we have seen, there was between 1918 and 1939 a decrease of over 600,000 acres in the area in Scotland under crop, and this was accompanied by an increase in pasture of over 400,000 acres. These facts, when applied to individual holdings, involved that many farms which were capable of growing crops of the kinds now required were wholly or largely in grass, and that their existing staff and equipment were incapable of undertaking the additional burden involved in arable cropping. In very many cases, also, the farms were isolated or were hill and marginal farms so difficult of approach as to preclude the probability of obtaining assistance from ordinary sources. The Government Tractor Service was, therefore, instituted to permit of more rapid expansion of arable cropping than would otherwise have been possible on farms of that kind. It is true that, in face of labour shortages, backward seasons, the lack of adequate tools for a particular job, and even a simple inability with existing equipment and staff to undertake that little more which meant so much in attaining maximum production, there were in the end few farms in Scotland on which, at some time during the war, the Tractor Section did not render assistance. Further, the Government tractors were "on the taxi-rank" and could not pick and choose between the jobs which were offered, and they had often, particularly after or during a spell of bad weather, to tackle work of special difficulty. An appreciation of the position as thus outlined is necessary to any fair assessment of the value of the Tractor Service to the farmer and to the nation. It was never intended,

and could not be expected, to earn business profits, and there is little ground for a true comparison between the financial results of the Government Service and those of a private business engaged in agricultural contracting.

While one can thus reject criticism of the service on the grounds of unsatisfactory financial results during war-time, it is true that, under the Scottish set-up, the administrative system left a good deal to be desired. It is not surprising, therefore, that the venture had its teething troubles, some of which persisted throughout the war. The Agricultural Executive Committees acted in effect as agents of the Department in booking farmers' orders, in setting out a programme and time-table for the work thus booked, and in exercising what could only be general supervision over its execution. The practical work was carried out under agreement between the Department and local firms of engineers. The latter were responsible for the servicing of the Government tractors and other equipment allotted to their area, and in carrying out the practical work they employed and controlled the necessary staff of supervisors, tractor-drivers, and other operators. The Department, in addition to carrying heavy financial duties in connection with the scheme, such as the collection of farmers' accounts and accounting with the local engineers, undertook responsibility for the purchase and allocation of implements. The latter task was at the outset characterised by some considerable lack of practical knowledge in such matters as the type of implement supplied for work of a particular kind or in particular areas. The administrative system thus evolved proved, on occasion, cumbersome, and the divided responsibility of Committee and engineers led to unnecessary difficulties. It seems doubtful, indeed, whether in the result the weight of "overhead charges" incurred on the service could stand expert scrutiny, and these must have made a substantial contribution to the heavy deficit at which the service is understood to have been run. While in many Committee areas the system worked smoothly and satisfactorily, it is suggested that, on the whole and subject to due economy, it would have been more effective had a larger share of the administrative and practical work been entrusted, as in England, to the Agricultural Executive Committees.

These comments do not affect the main and most important aspect of the work done by the Government Tractor Service. This was the case of a new and, as appears from the record of what was accomplished, a big business, instituted by a Government Department to meet an emergency and developed rapidly during five years of strenuous work.

It is interesting to note that the number of tractors privately owned by farmers in June 1939 was 6250. The number rose in March 1942 to 13,240, and in 1944 had reached 19,000—that is to say, over three times the number of those which were in farmers' hands at the beginning of the war. If one has regard to the tillage area in any of the war years, it appears that even on a straight-

forward acreage basis the record of the Government Service compares quite favourably with that of outfits in private ownership. If we keep in view the factors which have already been mentioned as dictating the character and location of the work allotted to the Government Service whose outfits, in strong contrast to privately owned, were at everyone's beck and call from one end of the county to another, we can more justly appreciate the efficiency and the effectiveness of the assistance which the service rendered. The urgent need was for food, and in the absence of the service the supply of food which was in fact secured would, within a narrow margin, have been lost to the extent of the acreage worked or harvested by the Government outfits. In view of the record of what it accomplished, that is a high and a well-merited tribute to the work performed by the "Tractor Section."

Reference has already been made to the increase of the number of tractors in private ownership. During the war we relied to a major extent for the supplies of these and other implements upon the United States, Canada, and Australia. Such imported machinery was allocated to applicant farmers on the recommendation of the local Agricultural Executive Committees, and the numbers of tractors and other machinery thus imported are given on page 73.

While weather, labour, and implements are the three chief requisites for the cultivation of the land, no account of Scottish agriculture during the war would be complete without reference to certain schemes instituted by the Government for the assistance of the industry. Government payments were associated with each of these schemes, so that they benefited the individual farmer financially. Their chief interest, however, lies in the fact that the majority of them can fairly be regarded as elements in a long-term agricultural policy and represented an endeavour to redress in some material respect the balance of our agriculture. From this latter point of view they are properly regarded as tools put into the farmer's hands by the Government, not only with the immediate purpose of assisting him to increase production during the war, but with the more important object of enabling ordered progress to be made towards an efficient and prosperous industry.

PLOUGHING GRANT SUBSIDY.

Our generation has experienced two world wars, but possibly most of its members think of the year between Munich and September 1939 as the most uneasy and anxious in their recollection. With the threat of war hovering over us, the thoughts of the Government naturally turned to agriculture as one of the industries upon which the nation would have to depend in the event of a crisis. As we have seen, one of the outstanding features of agriculture was the disproportionate and increasing area which was being laid down to grass. Accordingly, in May 1939, the Government announced a scheme under which a subsidy of £2

would be paid for the ploughing up for crop of every acre of land which had been under grass for seven years or more. Under the original terms of the scheme the grant was payable for land thus ploughed prior to 31st October 1939, but, in view of the outbreak of war, this period was extended and the scheme in effect continued throughout the war. The area under permanent grass in Scotland declined by over half a million acres between 1939 and 1942. That speedy advantage was taken of the grassland ploughing subsidy is shown by the fact that, for 1941 harvest, subsidy was paid on just short of a quarter of a million acres and that a further 17,500 acres of permanent grass was by the middle of November 1941 being ploughed up for the following harvest. The loyalty of the farmer and improved prices were, of course, the main factors in thus ensuring the cashing-in of the fertility of much of this permanent grass. The subsidy, however, was of very practical value, not only in compensating the farmer to some extent for increased costs, but in directing the farmer's energies on to lines most useful to the country and in ensuring that, following the breaking-up of the pasture, a rotation of essential foods would be produced. The amendment of the scheme which was effected later, and under which the subsidy was payable in certain circumstances when old pasture was broken up for direct reseeded, proved of still further value, and there is no sphere of war-time agriculture which has produced more valuable experience than that in relation to reseeding and the following course of management of permanent pasture.

Up to 31st December 1945 the remarkable total of 1,003,636½ acres of old grass had been ploughed up under this scheme. The total subsidy consequently paid to farmers was £2,007,273.

DRAINAGE.

Prior to the war there was no sight so depressing to anyone interested in Scottish agriculture as that of the good land which was being thrown out of commission by the want of drainage and of our hill-land which was being bogged down by lack of attention to the hill drains. Under Acts passed in 1930 and 1935 the Department of Agriculture were empowered, in cases where agricultural land was considered capable of improvement by drainage work or in danger of being flooded by the lack of drainage work, to institute schemes for the execution of the necessary work and to charge the owners or occupiers with costs in proportion to the benefit expected to accrue to their respective lands. The River Kelvin Scheme, instituted under these Statutes, was in fact being executed at the outbreak of war. Notwithstanding the existence of Government grants, however, agriculture was so depressed that it was impossible on financial grounds to do anything to meet the crying need which existed for drainage. It is little wonder, therefore, that one of the main facts which were

thrown up by the first inspections and reports by Agricultural Executive Committees was the critical need for this type of improvement. One of the first steps taken by the Government was in 1940 to fix at 50 per cent the grant given to landlords and occupiers towards the approved costs of drainage work and to extend the scheme so as to include in the costs, as eligible for grant, the services of the normal farm or estate staff and of fencing necessary for the protection of drains. The extent to which advantage was taken of the scheme and the extent of the land estimated to have been improved are shown on page 76.

At an early date in the course of the war, however, it became clear that, if for no other reason than the pressure upon farmers and their staffs in carrying out a programme of increased cultivation, the urgent need for the drainage of land could not be met by dependence upon the unaided efforts of landlords and tenants. There was always the further and major difficulty that in so many cases a drainage system serves or affects many different holdings, and that nothing short of the overhaul of the whole system will serve a useful purpose. A series of Statutes was, accordingly, passed which, while empowering the Secretary of State to compel the cleansing or scouring of defective water-courses by an individual owner, had the major purpose of extending the Department's duties and powers in initiating and carrying out schemes which affected any considerable number of holdings. No more useful work was done during the war than was carried through by the Department Engineers charged with these duties, and in many parts of the country agricultural eye-sores of many years' standing have in consequence been removed and fertile land made available once again to the farmer. The expenditure by the Department on such arterial drainage schemes is shown in the statistical information, and it is estimated that, as the result of these, over 26,000 acres of land had been benefited by the end of 1945.

The results of the increased attention paid to the drainage of our Scottish farms during the war must be regarded as satisfactory when viewed in the light of the inevitable shortage of labour and, so very often, of tiles. Not the least pleasing aspects of the experience thus gained have been the co-operation of landlords and tenants mutually interested in effecting major schemes and the increased knowledge and appreciation of mechanical aids in carrying out drainage work. No one would suggest, however, that we were able to do more during the war than touch the fringe of a very big job. There is ample scope in individual fields and in considerable areas of land for a continuance of the good work. That scope is not least on our hill pastures, where it was possible to accomplish comparatively little during the war years. The earnest hope may, therefore, be expressed that the Government will continue its practical and direct interest in this matter.

MARGINAL LAND.

By the summer of 1942 it was obvious that we had almost exhausted the possibilities of obtaining increased production from land which, even in the exceptional circumstances then prevailing, could normally be regarded as arable. The sound arable land was being intensively cultivated; permanent pasture had been broken up; and a heavy raid had already been made upon such reserves as existed in policy parks and on golf-courses and other recreation ground. It was clear, therefore, that some additional source for the production of essential foods must be tapped if a further increase in production was to be obtained. Inevitably the Government, under the advice of the Department of Agriculture and the Agricultural Executive Committees, turned to that large acreage of marginal land which it was uneconomic to crop and the area of which, owing to the financial position of agriculture prior to the war, had so largely increased. On 17th December 1942 the Secretary of State announced proposals for assisting production of crop on this area. Experience on the part of many enterprising farmers had already shown that, subject to early ploughing and adequate manuring and choice of seed, the cultivation of marginal land could be made to pay fairly well at the new prices. The majority of the occupiers of such land, however, could hardly be expected to take the risk involved in such a venture, and it was for their encouragement that the Marginal Land Scheme was brought into operation. Unfortunately the date of announcement was too late to enable much to be done to increase production in 1943, but in later years considerable success was achieved in redeeming this most derelict area of our farm-land. The Agricultural Executive Committees were charged with the duty of administering the scheme, and the task was not without difficulty. The test for benefit was that the character and situation of the land were such that it could not be regarded as an economic proposition to put it under crop in view not only of the costs of production but of the risks of crop failure. Land answering this test was, for the purposes of the scheme, regarded as marginal, but on practically every farm there are one or two fields which are of this description but which, in view of the crisis and of the prices derived from his sound arable land or dairy, the farmer could reasonably be expected to till, averaging out any prospective loss on so doing against the profit from the remainder of his holding. The scheme was inapplicable in such cases and was applied only where the farm as a whole could fairly be described as marginal. Subject to these conditions each Agricultural Committee was allowed a certain round sum to be devoted towards ensuring, either by direction or by agreement, that an area of marginal land would be devoted towards the production of tillage crop or, in special circumstances, reseeded for the purpose of affording better pasture. In most cases the land coming within the scheme had been for a lengthy period in permanent pasture and was eligible

for the £2 per acre ploughing subsidy. Under the scheme the Committees were empowered to make additional grants for further cultivation, seeds, manures, and the like. The usual basis adopted in fixing grants was to offer a grant sufficient, with the estimated proceeds of the intended crop, to make up a fair return to the farmer. The scheme, involving as it did the expenditure of £224,000 in 1944 in respect of 207,550 acres, worked satisfactorily so far as meeting the immediate needs for increased food production, but its most satisfactory feature lay in the experience gained, and in the examples shown, of the potentialities of this "depressed area." In that respect it has done, and it is hoped that it will continue to do, permanent good to Scottish agriculture.

HILL CATTLE SUBSIDY.

Simultaneously with the announcement of the Marginal Land Scheme the Secretary of State announced a scheme for fostering the breeding and rearing of cattle on hill farms and rough grazings. It had long been realised that the deterioration of our hill pastures was due in a material degree to the withdrawal of cattle from them. Mixed grazing by cattle and sheep ensured better pasture; the inroads of bracken were checked by cattle to the benefit of the sheep and the safeguarding of what is very often the best grass on the hill; and, not least, the waste involved in leaving our hill-land empty of cattle was very great. While the terms of the scheme under which subsidy became payable in respect of hill cattle varied from time to time, its main purpose was very properly that of stimulating the breeding and rearing of cattle on our rough pasture and high land. It was intended to be a Hill Cattle and not a Cattle on the Hill Subsidy. This feature, with its emphasis on the importance of breeding stock, is reflected and the enormous advance in the adequate grazing of cattle on our hill farms is clearly shown by the information given on page 74. The scheme has proved a great boon to the hill farmer and of considerable benefit to his pasture and pocket. Not the least satisfactory aspect of it has been the reappearance, after the lapse of many years, of cattle on our hills and in our valleys. This result of the scheme has appealed strongly to the eye and to the imagination of those who visit our countryside.

LIME.

It has long been recognised that our Scottish land was crying out for lime, and inevitably the effort to obtain increased production threw this need into higher relief. The Government instituted a special department charged with the duties of obtaining increased supplies and of allocating these as fairly as possible to the different districts. Heavy and increasing demands for lime are clearly reflected in the particulars given on page 77, and it

is of special interest to observe the increasing extent to which it proved possible to meet Scottish needs from Scottish sources. A system of Government subsidies which was already in operation was continued during the war, and there is perhaps no element in good husbandry which is now more generally recognised as essential than the application of lime to much of our land which was, and still remains, sadly deficient in its lime content.

OTHER ASSISTANCE RENDERED TO THE FARMER.

Space does not permit of more than a reference to certain schemes of which considerable advantage was taken and each of which formed an important factor in the efforts to rehabilitate agriculture. Among these were the schemes for assisting in the cutting of bracken, in the introduction of water supplies to farm buildings and later also to farm houses, and in the destruction of vermin. Certain interesting figures relating to the first-named scheme are given on page 75. These show the substantial demand for the facilities and the substantial extent to which advantage was taken of the assistance offered. We have, however, as yet tackled only a negligible part of the area in Scotland under bracken. Nor have we advanced more than a step towards the provision of such essential needs as that for adequate water supply on agricultural holdings. Inevitably, little improvement in the housing of agricultural workers was possible during the war, and it is probably true that no more urgent need exists now in agriculture than that of increasing and suitably locating a sufficient number of houses of modern standard for the accommodation of that labour without which the industry cannot carry on.

ALLOTMENTS.

It would be unfair to close this account of Scottish agriculture during the war without some reference to the substantial contribution made to the national food supplies by those who are justly entitled to be called farmers, but who operate on the smallest known scale.

Attention has already been drawn to the fact that the demand upon the home producer was not merely for an increase in quantity but also one for sufficient variety to afford a balanced ration. For the latter purpose it was recognised that, even prior to the war and with the whole world upon which to draw for imports, the diet of the ordinary citizen was seriously deficient in vitamin C. The position in this respect was, of course, rendered additionally critical when, on the outbreak of war, we were deprived of the imports of fruit, vegetables, and other vitamin-C foods. In these circumstances much credit is due to the microscopic farmer,

commonly known as the allotment holder. Fortunately for the nation and for the appearance of the country in the vicinity in and round our cities, there will always be the man who is keen on growing some living plant. Without him the gardens which are the glory of many districts would be wilderness. To that type of man we were indebted for the fact that in 1939 there were some 18,000 allotments in cultivation, and that in addition there were about 3000 school plots and 2400 railwaymen's plots. The urgent needs of the war gave a great impetus to the movement of which many of the old allotment holders formed the backbone. Great credit in this respect was also due to the efforts of the Scottish Gardens and Allotments Committee, which was appointed by the Secretary of State in April 1940 and over which Sir Robert Greig presided so successfully. It is not within the scope of this article to detail the various activities of that Committee or of the Allotment Associations which were formed and the membership of which reached over 56,000. The 'News Letter' issued by the Committee became a familiar paper throughout Scotland and reached a circulation of 3000 per month. The result of these combined efforts was remarkable. The number of allotments increased progressively, reaching 39,000 in 1940 and a peak of 84,000 in 1943. Quite a considerable proportion of these represented allotments on which vegetables were successfully grown during the war by Service personnel. Sir Robert Greig estimates that during the six years of war the combined produce harvested from these small areas amounted to 141,000 tons and that, adding the output from private gardens, a total of 210,000 tons of produce of very high vitamin-C content were produced. It is unfortunate from the point of view of the national interest that, already in 1945, the number of allotments and plots showed a considerable decrease, and it is to be hoped that we are not after this war to be faced with the depressing sight of derelict allotments which were so evident after 1918. The fact, however, appears to be that the impact of the allotment movement has so far been felt only during war. The average holder looked upon his allotment as a contribution to the war effort completed when war is over, and, as the work was done mainly by men and women fully occupied and often hard-pressed by more normal duties in office or in factory, there was an undoubted tendency to include the dropping of the allotment as part of the ease-up to which everyone felt entitled and for which everyone felt much inclined after the war effort ceased. There are, however, many citizens who for the first time knew the pride, and there is no more satisfying pride, of presenting on his own table food of his own production, and of keeping it supplied in this way over a surprisingly lengthy period of the year. The existence of these enthusiasts leaves us with the hope that, after the first reaction from war effort is over, the allotment movement will again revive and flourish.

CONCLUSION.

Here, and in the Tables which follow, is the record of the job which was set, of some of the principal tools which were provided for the task, and of the success which attended the efforts of the farmer and his staff to finish the job. Parts of the story are so amply recorded in the statistical information that it has been thought unnecessary to refer specially to these aspects of agriculture in the body of this article. Where any activity or scheme holds special interest for the future, it has been discussed at greater length than have the purely temporary phases of our war-time agriculture. In this way considerable reference has been made to the future of the industry, and it would be inappropriate to discuss in further detail its prospects or the lines on which it may develop. We may limit ourselves here to the expression of the hope that the services to the nation which agriculture has rendered, and which it has again proved its capacity to render in the future, will henceforth be assessed at their proper value by our people and by our Government.

"The Earth commits no breach of trust," and the story of Scottish agriculture during the war shows the wonderful response which our Scottish land made to the very heavy call made upon it. Sir Walter Scott was fond of saying that every Scotsman has a "yird hunger," and the volume of production attained during the war could have been secured only by a race of farmers and farm workers who loved the soil on which they laboured. This article opened with a quotation from the words of Nelson, and the record of what was accomplished between 1939 and 1945 by Scottish agriculturists shows that they are entitled now, in all humility and reverence, to say also with Nelson, "Thank God, I have done my duty."

[STATISTICS.]

CROPPING OF AGRICULTURAL LAND IN SCOTLAND, 1939-45.

IN THOUSAND ACRES.

	1918	1939	1940	1941	1942	1943	1944	1945
Arable land—								
Grain—Wheat	79	80	100	106	113	171	152	91
Barley	153	100	103	115	148	214	236	217
Oats	1240	777	909	1071	1158	1011	989	1004
Mixed grain	7	2	5	9	5	7	*27	*21
Rye	0	1	2	2	3	11	10	7
Total grain	1485	960	1119	1303	1427	1414	1414	1340
Potatoes	169	134	157	189	218	236	239	224
Sugar beet	—	8	6	7	14	13	13	12
Turnips (for stock feeding)	394	308	303	317	326	326	323	327
Other fodder crops—								
Rape	3	12	15	27	31	35	35	38
Kale	—	8	11	13	12	14	13	12
Cabbage	4	4	4	5	5	5	7	5
Vetches and tares	15	4	10	18	21	26	6	4
Mangolds	3	5	8	7	6	6	6	6
Beans (for stock feeding)	8	2	4	7	7	10	10	8
Vegetables	1	4	5	6	5	8	14	4
Small fruit	6	9	9	8	7	7	7	6
Flax (for fibre)	1	—	3	6	7	8	9	6
Other crops	3	4	4	4	5	7	10	9
Bare fallow	6	19	6	7	6	5	8	9
Total crops and fallow	2100	1481	1664	1924	2097	2120	2114	2010
Rotation grasses and clover—								
For hay	389	385	392	377	354	368	360	374
For grazing only	963	1070	1008	931	873	882	897	958
Total	1352	1455	1400	1308	1227	1250	1257	1332
Total arable land	3452	2936	3064	3232	3324	3370	3371	3342
Permanent grassland—								
For hay †	152	174	163	150	132	124	120	119
For grazing only	1157	1448	1300	1088	977	933	933	963
Total	1309	1622	1463	1238	1109	1057	1053	1082
Total area under crops and grass	4761	4558	4527	4470	4433	4427	4424	4424

* Includes mashlum, which was included with vetches and tares in previous years.

† Including timothy hay.

LIVE STOCK STATISTICS OF SCOTLAND, 1939-45.

IN THOUSANDS.

At 4th June each year	1918	1939	1940	1941	1942	1943	1944	1945
Dairy cattle—								
Cows and heifers in milk	—	289	292	304	303	303	301	305
Cows in calf but not in milk	—	46	48	50	55	61	59	60
Heifers in calf	—	67	73	72	84	90	96	95
Bulls	—	13	13	19	20	21	22	22
Other cattle—								
2 years and above	—	43	41	46	43	39	41	44
1-2 years old	—	135	129	140	137	141	146	147
Under 1 year old	—	148	144	144	152	153	154	150
Total dairy cattle	—	741	740	775	794	808	819	823
Beef cattle—								
Cows and heifers in milk	—	85	85	76	73	76	79	87
Cows in calf but not in milk	—	10	11	10	11	11	11	12
Heifers in calf	—	13	12	9	12	11	12	12
Bulls	—	6	6	8	8	9	9	9
Other cattle—								
2 years old and above	—	156	165	137	148	168	184	203
1-2 years old	—	196	197	174	169	172	177	188
Under 1 year old	—	142	144	122	120	122	127	126
Total beef cattle	—	608	620	536	541	569	599	637
Total cattle (dairy and beef)	1209	1349	1360	1311	1335	1377	1418	1460
Sheep—								
Ewes for breeding	3011	3412	3351	3070	3013	2914	2932	2989
Rams	—	101	100	91	92	95	97	97
Other sheep and lambs	3852	4494	4332	3598	3726	3757	3804	3813
Total sheep and lambs	6863	8007	7783	6759	6831	6766	6833	6899
Pigs—								
Breeding sows	16	30	31	19	21	19	20	18
Boars	—	3	3	2	2	2	2	2
Other pigs	112	219	237	197	170	169	146	151
Total pigs	128	252	271	218	193	190	168	171
Poultry—								
Fowls—								
Over 6 months	—	3456	3814	3656	3152	2923	3003	3176
Under 6 months	—	3866	3553	2467	3036	2859	3162	3630
Ducks	—	231	226	184	218	248	275	307
Geese	—	27	26	21	24	31	36	44
Turkeys	—	131	122	89	100	117	131	156
Total poultry	—	7711	7741	6417	6530	6178	6607	7313
Horses—								
For agricultural purposes	137	100	101	102	100	96	92	88
Other horses	73	42	38	36	34	31	29	29
Total horses	210	142	139	138	134	127	121	117

PRODUCE OF CROPS IN SCOTLAND.

ESTIMATED YIELDS OF PRINCIPAL CROPS PER ACRE : 1939-45 AND PRE-WAR.

	10 years' average.		1939	1940	1941	1942	1943	1944	1945
	1930-39								
	1935-44								
Wheat	Cwt. 22.0	Cwt. 22.3	Cwt. 21.8	Cwt. 22.9	Cwt. 22.3	Cwt. 24.0	Cwt. 22.0	Cwt. 21.5	Cwt. 22.2
Barley (including bere)	18.8	19.7	19.1	20.3	19.8	21.5	20.1	18.1	19.6
Oats	15.9	16.2	15.8	16.8	16.6	16.7	16.7	15.3	16.6
Hay, rotation	32.6	31.9	29.7	31.4	32.1	31.0	33.0	31.5	31.8
Potatoes	Tons 7.0	Tons 7.1	Tons 7.7	Tons 7.8	Tons 7.2	Tons 6.9	Tons 7.5	Tons 6.3	Tons 7.1
Turnips and swedes	15.7	17.2	16.1	18.4	17.7	18.3	17.7	17.4	16.7
Sugar beet (a)	7.6	7.6	7.9	9.0	8.0	6.0	7.7	6.9	8.4

(a) Washed and topped.

PRODUCE OF CROPS IN SCOTLAND—continued.

ESTIMATED TOTAL PRODUCTION OF THE PRINCIPAL CROPS: 1939-45 AND PRE-WAR.

	8 years' average, 1936-38	1939	1940	1941	1942	1943	1944	1945
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Wheat	104,000	87,000	115,000	118,000	136,000	188,000	164,000	101,000
Barley (including bere) .	81,000	95,000	104,000	114,000	159,000	215,000	214,000	213,000
Oats	647,000	614,000	761,000	889,000	967,000	845,000	757,000	834,000
Hay, rotation	638,000	571,000	615,000	603,000	549,000	607,000	566,000	594,000
Potatoes	943,000	1,040,000	1,220,000	1,369,000	1,511,000	1,762,000	1,516,000	1,596,000
Turnips and swedes . . .	5,625,000	4,983,000	5,611,000	5,660,000	5,995,000	5,879,000	5,832,000	5,488,000
Sugar beet (a)	55,000	60,000	57,000	58,000	83,000	104,000	90,000	102,000

(a) Washed and topped.

INDEX NUMBERS OF PRICES OF AGRICULTURAL PRODUCE IN SCOTLAND GENERAL INDEX.

1927-29 = 100.

(SUBJECT TO REVISION.)

	1939	1940	1941	1942	1943	1944	1945
January	88½	114	139½	161½	170½	174	177½
February	83	114½	132½	161	165½	172	176
March	80	107	131½	158	159½	165½	169½
April	82½	107½	129	149	150	155	160½
May	81	105½	126½	145½	145	147	151
June	80	106	126	144½	143½	145½	148
July	81	114	126	139	142½	140	152
August	81	119	125½	138	138	141½	148
September	87½	121½	126	140	139	145	151
October	92	131	143	152½	155½	158½	166
November	96	132½	148	161	163	167	174
December	105	136	154	167	169	172½	159
Annual average	85½	115	131	147	149	153½	160

PRICES OF AGRICULTURAL PRODUCTS, &c.
SCOTLAND, 1939-1945.

Years		1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
CROPS—							
Wheat (per cwt.)	.	1939 crop s. d. 6 11 (a)	1940 crop s. d. 14 5	1941 crop s. d. 15 1	1942 crop s. d. 16 10	1943 crop s. d. 15 4	1944 crop s. d. 14 5
Barley (per cwt.)	.	12 1	18 4	37 1	32 8	26 9	24 0
Oats (per cwt.)	.	10 3	14 2	14 4	15 4	15 4	15 4
Ware potatoes (per ton)	.	88 3	134 6	113 0	114 8	118 7	122 2
Sugar beet (per ton)	.	48 2	60 8	63 7	86 10	85 8	82 9
Hay (per ton)	.	115 0	130 0	166 6	166 0	163 3	164 0
FAT STOCK (June-May years)—							
Fat cattle (per cwt. D.W.) (b)	.	s. d. 84 8	s. d. 107 3	s. d. 111 10	s. d. 119 4	s. d. 123 7	s. d. 124 11
Fat sheep (per lb. D.W.) (b)	.	0 10½	1 0½	1 4½	1 4½	1 4½	1 5½
Fat pigs—							
Bacon (per score D.W.) (b)	.	15 3	19 9	21 8	23 9	23 9	23 9
Pork (per score D.W.) (c)	.	11 3	13 8	14 0	14 8	14 8	14 8

(a) Deficiency payment over the year amounted to 4s. 1d. per cwt. of wheat sold.

(b) 1941-45—average price of animals purchased by Ministry of Food in Scotland.

(c) First quality only.

PRICES OF AGRICULTURAL PRODUCTS, &c.—*continued*.

STORE CATTLE (1st quality).

June-May years		1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
<i>Aberdeen Angus—</i>		£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Yearlings	.	16 5	18 2	21 9	22 7	25 4	25 6
2-year-olds	.	22 12	27 1	31 8	34 4	36 15	36 13
<i>Shorthorn Crosses—</i>							
Yearlings	.	16 1	18 9	21 11	22 15	24 17	25 1
2-year-olds	.	21 14	26 9	30 7	32 9	34 16	35 2
<i>Galloway—</i>							
Yearlings	.	15 7	17 2	18 13	19 5	19 16	20 8
2-year-olds	.	20 17	25 9	27 16	27 9	29 7	30 3

SHEEP.—Index numbers of autumn sale prices of hill sheep and lambs.

Note.—The following series are chain indices, based on 1939 = 100, and calculated from successive two-year comparisons of corresponding sale days and, in later years, of identical hirsels.

	1939	1940	1941	1942	1943	1944	1945
HILL LAMBS—		£	£	£	£	£	£
Cheviot	100	132	201	177	199	196	189
Blackface	100	125	163	151	171	183	192
DRAFT HILL EWES—							
Cheviot	100	136	164	138	134	142	149
Blackface	100	139	182	168	153	148	155

PRICES OF AGRICULTURAL PRODUCTS, &c.—continued.

June-May years		1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
PRODUCE—							
Milk (d) (liquid, per gallon)	.	Pence 15-04	Pence 19-82	Pence 22-28	Pence 23-30	Pence 24-51	Pence 25-71
Wool (e) (per lb.)	.	d. 9-58	s. d. 13-59	s. d. 15-65	s. d. 17-68	s. d. 17-67	s. d. 17-66
Eggs (per dozen)	.	1 10½	2 6	3 1½	3 0½	3 0½	3 0½

(d) Includes milk sold through marketing schemes, milk sold by producer retailers, and milk used for perquisites and farm-house consumption.

(e) Average of washed and greasy wool, washed wool being converted to greasy basis before ascertaining average price.

SCOTTISH MILK MARKETING SCHEME: ORDINARY PRODUCERS' MONTHLY AVERAGE PRICES.

	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46
June .	d. 9½	d. 12	d. 14½	d. 15½	d. 15½	d. 15½	d. 15½
July .	9½	13½	14½	15½	15½	15½	15½
August .	10½	14½	16½	17½	17½	17½	17½
September .	11½	16	17	18½	18½	20	20½
October .	13½	21	24	26	27½	28½	28½
November .	14½	21½	26½	29½	30½	30½	31½
December .	15½	23	28	31	32	32	33
January .	18	23	29½	31	32	32	33
February .	15½	19½	27½	31	30	30	31
March .	13½	18½	26½	23½	26	26	26½
April .	13½	16½	17½	17½	19½	20½	21½
May .	11½	14	15	15	15½	15½	16

STATISTICS ILLUSTRATING NUMBERS AND PRICES OF PEDIGREED AND OTHER STOCK SOLD BY AUCTION.

HORSES—CLYDESDALES.

Lanark—October Sale.

	1939		1940		1941		1942		1943		1944		1945	
	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price
Geldings of all ages	364	£ s. d. 52 9 8	430	£ s. d. 50 3 0	468	£ s. d. 71 9 9	486	£ s. d. 81 8 8	430	£ s. d. 94 0 3	462	£ s. d. 71 2 11	343	£ s. d. 73 19 9
Of which mature geldings	95	63 17 0	138	62 8 8	152	88 17 0	174	109 15 0	143	121 18 0	155	99 7 4	115	100 11 1
Fillies of all ages	272	37 17 10	300	35 14 8	287	54 11 0	285	53 14 2	261	71 2 3	287	51 1 6	220	54 9 9
Of which 2-year-old fillies	137	43 3 2	152	41 17 5	155	58 9 10	144	64 4 2	136	75 9 10	148	53 11 9	109	57 13 9
Mares (brood and yeld)	63	46 16 0	72	52 6 0	115	68 18 1	106	76 18 10	113	87 18 5	110	69 6 0	97	68 18 4
Of which brood mares		(not separately stated)			83	71 1 3	81	80 13 10	73	95 13 8	87	74 1 10	76	71 2 10
Colt foals	107	24 12 0	106	26 7 0	122	36 14 5	96	45 5 0	84	50 13 9	117	34 3 11	110	36 2 0

Aberdeen (Central Mart)—October Sale.

	1939		1940		1941		1942		1943		1944		1945	
	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price
Colt foals	61	£ s. d. 19 16 5	95	£ s. d. 19 3 4	103	£ s. d. 26 13 8	120	£ s. d. 29 2 5	144	£ s. d. 34 16 6	142	£ s. d. 26 10 3	140	£ s. d. 27 12 10
Filly foals	53	21 19 6	86	18 1 7	82	25 19 7	85	29 13 5	132	36 5 9	120	26 2 6	100	30 19 2

STATISTICS ILLUSTRATING NUMBERS AND PRICES OF PEDIGREED AND
OTHER STOCK SOLD BY AUCTION—*continued.*

SHEEP.

	1939		1940		1941		1942		1943		1944		1945	
	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price	No.	Average price
Blackfaced—		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
Rams	6,050	6 19 6	6,200	8 18 10	5,800	14 10 4	6,250	16 1 9	7,765	14 3 10	7,610	16 10 9	7,650	19 15 11
Ram lambs	3,890	3 3 7	3,500	4 15 2	3,900	7 5 0	5,165	7 6 7	5,650	8 0 7	4,950	11 5 1	5,300	13 3 7
Cheviots—														
Rams	1,620	8 1 2	1,740	9 0 9	1,510	14 0 7	1,530	16 9 10	1,860	19 16 1	1,950	20 15 6	2,080	22 1 9
Ram lambs	60	5 18 7	55	7 14 6	40	10 2 6	101	13 11 0	100	9 2 0	80	18 7 6	80	13 3 9
Border Leicesters—														
Rams	3,650	8 0 9	3,370	8 13 0	3,235	11 17 5	2,400	14 12 7	2,840	17 15 6	2,775	21 6 6	2,910	22 2 11
Ram lambs	2,475	5 9 6	2,280	5 9 11	2,185	9 10 4	1,485	10 9 9	2,200	14 4 6	1,860	17 10 0	2,480	17 3 11
All breeds—														
Rams	12,400	7 13 10	12,250	9 2 8	11,425	13 18 1	11,035	16 8 6	13,510	16 9 10	13,290	19 0 11	13,040	21 4 7
Ram lambs	8,840	5 2 3	7,750	6 0 6	7,635	8 16 3	7,965	9 0 1	9,580	10 12 10	8,360	13 15 7	9,740	14 19 9

ACREAGE PAYMENTS—SCOTLAND.

(A) RATES OF PAYMENT (£ PER ACRE).

Year of Harvest of Crop	1940	1941	1942	1943	1944	1945	1946
Wheat . . .	—	—	—	3	4	4	2
Rye . . .	—	—	—	3	4	4	2
Potatoes . .	—	10	10	10	10	10	10

(B) AMOUNTS PAID AND ACREAGES TO WHICH THEY RELATE.

	1941	1942	1943	1944	1945
(i) Amounts paid—	(c)	(c)			(a)
£	£	£	£	£	£
Wheat . . .	—	—	507,936	609,084	361,036
Rye . . .	—	—	31,875	35,850	21,036
Potatoes	1,892,720	2,179,220	2,318,630	2,357,993	2,168,695
Total .	1,892,720	2,179,220	2,858,441	3,002,927	2,550,767
(ii) Acreages—			(b)	(b)	(b)
Wheat . . .	—	—	169,312	152,271	90,259
Rye . . .	—	—	10,625	8,962·5	5,259
Potatoes	189,272	217,922	231,863	235,799·3	216,869·5

NOTES.

(a) Amounts passed for payment up to 26th March 1946.

(b) The acreages, in total, do not correspond exactly with the total acreages under the various crops as returned in the Agricultural Census Return made at 4th June each year, for the following reasons :—

- (1) Acreage payments are made in respect of the specified crops to persons occupying one acre or more ; agricultural census returns are made in respect of subjects extending to $1\frac{1}{4}$ acres or more.
- (2) All growers of the specified crops do not apply for payment.
- (3) Application for payment is made in respect of crops grown on subjects for which agricultural returns are not normally made—*e.g.*, playing fields ploughed up during the war.
- (4) Where there has been negligence in cultivation, &c., payments are made on reduced acreages ; there are relatively few cases of deductions of this nature.

(c) Figures for 1941 and 1942 are estimates, obtained by assuming that an acreage equal to that returned in the Agricultural Returns qualified for acreage payments at full rate.

AGRICULTURAL WAGES INDEX NUMBER (1928-29 = 100).

1939	1940	1941	1942	1943	1944	1945
105	125	149	182	187	206	222

INCOME TAX.

COMPARATIVE STATEMENT SHOWING FARMER'S LIABILITY TO TAX FROM 1939 TO 1945
AS COMPARED WITH 1913 TO 1920.

	1913	1914	1915	1916	1917	1918	1919	1920	1939	1940	1941	1942	1943	1944	1945
Schedule of charge . . .	←				Sch. B						Sch. D over £300	←	Sch. D over £100		
Basis of assessment when Sch. B applies . . .	1/2 annual (rental) value	1/8 annual value	3/6	5/-	5/-	6/-	6/-	6/-	7/-	8/6	10/-	10/-	10/-	10/-	10/-
Standard rate of income tax	£160	£160	£160	£130	£130	£135	£135	£135	£125	£120	£110	£110	£110	£110	£110
Exemption point . . .	£200	£240	£220	£220	£220	£245	£285	£378	£525	£444	£376	£376	£376	£376	£376
Do. married man with four children . . .			£220	£220	£220	£245	£285	£378	£525	£444	£376	£376	£376	£376	£376
E.P.D.					Farmers not liable				60%	←	£1500	←	£2500	←	£3450
E.P.T.									60%	←	£1500	←	£2500	←	£3450
E.P.T. minimum standard									60%	←	£1500	←	£2500	←	£3450
E.P.T. rate of duty . .									60%	←	£1500	←	£2500	←	£3450

STATISTICS OF MILK PRODUCTION AND SALES, 1939-1945.

TOTALS FOR AREAS OF THREE SCOTTISH BOARDS.

Winter period=months of October-March inclusive.

Summer period=months of April-September inclusive.

	Summer 1939	Winter 1939-40	Summer 1940	Winter 1940-41	Summer 1941	Winter 1941-42	Summer 1942	Winter 1942-43	Summer 1943	Winter 1943-44	Summer 1944	Winter 1944-45	Summer 1945
Thousands of Gallons													
Supplies—													
Production	79,265	56,776	78,928	55,283	77,974	49,178	79,725	50,053	80,664	53,295	79,733	54,793	82,586
Exports (net)	2,290	2,325	1,850	1,094	291	1,456	139	2,695	284	3,270	270	4,059	391
Imports (net)	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	76,975	54,451	77,046	54,189	77,683	50,634	79,864	52,748	80,938	56,565	80,053	58,852	82,977
Utilisation—													
Liquid sales	42,848	41,179	47,558	50,983	53,499	49,016	57,156	51,429	59,270	55,007	61,841	57,034	64,065
Of which—													
Milk in Schools													
Scheme	891	805	986	1,376	1,533	2,359	1,847	2,588	1,961	2,635	1,887	2,549	1,738
National Milk													
Scheme	—	—	1,300	6,641	7,203	7,274	7,229	7,565	9,478	9,425	9,841	9,612	9,531
Manufacture	34,127	13,272	29,488	3,306	24,184	1,618	22,708	1,319	21,668	1,558	18,212	1,818	19,012

WORK UNDERTAKEN BY THE TRACTOR SERVICE OF THE DEPARTMENT OF
AGRICULTURE FOR SCOTLAND.

Operation	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45 (Provisional)
	Acres	Acres	Acres	Acres	Acres	Acres
Ploughing	11,151	48,564	94,620	118,442	117,756	108,000
Other cultivations	19,915	70,441	120,129	184,266	178,215	176,000
Total cultivations	31,066	119,005	214,749	302,708	295,971	284,000
Grain harvesting (binder and combine)	25,905	58,684	124,597	107,665	109,488	92,000
Hay mowing	8	1,510	4,581	5,669	8,429	12,000
Potato digging	9	849	2,146	5,624	6,567	3,000
Total harvesting	25,922	61,043	131,324	118,958	124,484	107,000
Grand total	56,988	180,048	346,073	421,666	420,455	391,000

MACHINERY HELD BY DEPARTMENT OF AGRICULTURE FOR SCOTLAND—TRACTOR SERVICE—1939-1945.

	Dec. 31, 1939	Dec. 31, 1940	Dec. 31, 1941	Dec. 31, 1942	Dec. 31, 1943	Dec. 31, 1944	Dec. 31, 1945
Tractors—Wheeled	112*	383	777	1085	1162	1176	1124
Tracklaying	—	—	15	95	117	132	145
Sets of Ford Ferguson implements (including ploughs)	—	—	—	100	151	160	176
Ploughs	96	241	560	1359	1561	1630	1675
Disc harrows	30	75	350	516	590	761	653
Seed harrows (sets)	40	41	251	363	506	506	515
Combined drills	—	—	—	112	115	165	190
Seed drills	3	60	186	259	259	259	259
Broadcast sowers	7	40	60	108	133	133	133
Cultivators and grubbers	—	56	231	292	363	382	386
Manure distributors	30	78	78	178	292	408	407
Rollers	18	40	61	113	163	193	198
Row crop implements	—	9	44	67	110	110	110
Potato diggers	—	—	80	190	325	336	347
Potato planters	—	10	10	30	40	41	41
Binders	—	286	636	897	1047	1047	1058
Mowers	—	3	33	72	72	117	127
Threshing mills	—	25	31	82	126	140	146
Balers	—	—	2	46	51	78	84
Trailers	18	474	700	1103	1401	1573	1584
Combine harvesters	—	—	—	—	—	8	11
Potato sorters (power drive)	—	—	—	—	—	19	25
Crop sprayers	—	—	—	—	—	24	35

* These 112 machines were held in store for the Tractor Service at the beginning of the war, but only 12 had been brought into use by 31st December 1939, the remainder being released shortly afterwards.

GENERAL NOTES.

(1) This statement covers the main classes of equipment held for the Tractor Service, but excludes such minor items as elevators, hay and straw trussers, &c.

(2) The above figures include a number of implements which have reached the stage where it would no longer be economic to overhaul them for further use.

NUMBERS OF IMPORTED TRACTORS AND CERTAIN OTHER IMPORTED AGRICULTURAL MACHINERY ALLOCATED TO SCOTLAND, 1942-1945 (a).

	1942 (b)	1943	1944	1945
Tractors—				
Tracklaying	246	55	57	42
Wheeled	1150	1175	782	367
Tractor ploughs—				
2-furrow	1097	204	475	550
3-furrow	155	429	188	71
Binders	519	1420	658	987
Combines	3	28	98	37
Potato elevator diggers	239	394	94	67
Pick-up balers	16	15	26	13

NOTES.

(a) This table comprises all machines which came from U.S.A., Canada, or Australia, but excludes a few machines which came from Eire.

In addition to the machines detailed in the table, hoes, drills, broadcast seeders, and other less important implements were imported in appreciable numbers, but no statistics of the allocations of these to Scotland are available.

(b) Includes a few tractors delivered during 1941.

HILL CATTLE SUBSIDY.

GENERAL NOTE.—The comparability of the following figures is subject to certain qualifications, since the class of cattle eligible, the type of farm, and the person entitled to receive subsidy have changed from time to time.

(A) RATES OF GRANT—PER HEAD.

	1941-42 Scheme (a) (b)	1943 Scheme	1944 Scheme	1945 Scheme	1946 Scheme
Cows	£2	£3	£3	£4 10 0	£5 10 0
Heifers and bullocks	—	£3	£3	£2 10 0	£1 10 0

(B) AMOUNTS PAID AND NUMBERS OF STOCK TO WHICH THEY RELATE.

	1941-42 Scheme (a)	1943 Scheme	1944 Scheme	1945 Scheme
Amounts paid .	£28,681	£338,631	£489,750	Figures not yet available
Head of cattle .	9,398 (c)	112,877	163,250	

NOTES.

(a) The 1941-42 Scheme was operative in respect of cattle on the hill in 1941, or in 1942, or in both years.

(b) Under the 1941-42 Scheme only, payments of five shillings per cow for service fees were also available for herds of up to ten cows.

(c) This number includes animals withdrawn from the Scheme at the end of 1941, and other animals which came into the Scheme only at the beginning of 1942.

BRACKEN DESTRUCTION—GRANTS BY DEPARTMENT OF AGRICULTURE FOR SCOTLAND.

Calendar years	1939	1940	1941	1942	1943	1944	1945
Assisted bracken cutting (on acreage basis)—							
Acreage cut once	—	—	14,476	25,934	32,658	34,208	33,008
Acreage cut a second time	—	—	11,802	15,560	15,767	13,063	11,172
Grant (a)	—	—	£3,077	£11,700	£19,349	£18,453	£16,000 (b)
Assisted purchase of bracken cutting machinery—							
Acreage cut once	13,780	10,368	4,689	1,738	1,340	763	310
Acreage cut a second time	13,780	10,368	4,689	774	649	536	56
Grant	£840	£618	£308	£155	£147	£117	£34

NOTES.

(a) After deduction of farmer's contribution towards the cost of bracken cutting performed by the Department.

(b) Provisional figure.

DRAINAGE.

April-March years	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945
(a) Grants under the scheme for the assistance of agricultural drainage—							
Number of grants	800	890	1,570	2,000	1,900	2,900	2,380
Payments	£15,000	£25,000	£51,000	£84,000	£85,000	£150,000	£131,000
Estimated area improved—							
Arable (acres)	17,000	32,000	44,000	46,000	41,000	68,600	58,000
Hill (acres)	89,000	53,000	42,000	23,000	29,000	50,000	60,500
Total (acres)	106,000	85,000	86,000	69,000	70,000	118,600	118,500
(b) Arterial drainage schemes carried out by the Department of Agriculture for Scotland—							
Expenditure	£9,741	£8,730	£36,834	£51,816	£52,906	£33,400	£31,981

* April to December.

DELIVERIES OF LIME TO FARMERS IN SCOTLAND (TONS).

July-June years	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945 *
Total deliveries, including low-grade limes .	204,000	190,000	260,000	470,000	600,000	431,500	247,800
Equivalent CaO content	147,000	126,000	173,000	262,000	339,000	263,000	146,000
Of which Scottish production	116,000	107,000	110,000	290,000	364,000	268,500	156,300
Equivalent CaO content	69,000	60,000	62,000	145,000	187,000	148,000	83,000

* July to December.

DAIRY EDUCATION IN SCOTLAND.

By JAMES KIRKWOOD, N.D.A., N.D.D., The Dairy School, Auchincruive.

ALTHOUGH Dairy Education in the academic sense is of comparatively recent origin, in Scotland dating back a mere half-century or so, its roots lie deep in the history of the parent industry—Agriculture. Dairying had long since become an important factor in the life and economy of many farms, notably in the south-west of Scotland, where, for reasons of soil and climate, other systems of farming had proved less generally adaptable. Much experience had been accumulated—much that is still useful—but there was no clear perception of underlying principles nor any organised means of disseminating knowledge. The spread of general education no doubt smoothed the way for the changes that followed, but it was not until the advantages of technical education were understood and appreciated that dairying became a subject of serious study. Since then dairy education has played an important rôle in the advancement of technical efficiency both on the farm and in its off-shoot, the creamery.

It is not surprising that most developments in Scottish dairying centred in the south-west of the country, for, in addition to its favourable natural conditions, this relatively populous area provided a ready outlet for such products as milk, butter, and cheese. The particular form of disposal depended largely on the distance of the producer from his market, and hence, according to distance, dairy farmers were divided into three main categories—milk producers near the villages, towns, and cities; butter-makers farther afield, but still within travelling distance; and cheese-makers in the more remote districts. True, there were deviations from this general system of grouping, but the point is that each producer, within the limits of knowledge of his time, became a specialist in his own line and moulded his farming practice to suit.

Such a system could not be static in view of the ever-increasing demand for milk and the swelling volume of imports of butter and cheese from continental and colonial sources. A new orientation began to take shape about the beginning of the present century, slowly at first but with significant portent. The circle of milk sellers, already growing, was further extended by the establishment of a number of creameries in areas where cheese was formerly made. Then came World War No. 1 and the virtual extinction of commercial farm butter-making. In the years that followed farm cheese-making continued to decline, mainly because of the widening disparity between milk and cheese values, but influenced also by improved transportation facilities and the growth of the creamery system. Milk from the remoter districts found its way into the liquid market, often with unsettling result on the price structure. The Scottish Milk Agency, or Milk Pool as it was called, came into

being, but had little or no stabilising effect and soon earned its demise. This paved the way for organised marketing on a national scale and led to the advent of the Milk Marketing Boards in 1933; only then could a more or less settled policy be discerned. Farmers were to be paid equality of price for their milk, whether or not they chose to manufacture it themselves, and such milk as was surplus to liquid requirements was to be manufactured by the Boards and by proprietary creamery concerns. The problem of manufacture in Scotland fell naturally within the purview of the Scottish Milk Marketing Board, which, functioning from the Grampians south, assumed administrative responsibility for by far the densest milk-producing areas of the country.

The transitions of the past ten years are well illustrated in the following figures ¹ relative to the production and utilisation of milk within the Scottish Milk Marketing Board's area :—

	1934-35. Gallons.	1944-45. Gallons.
Liquid sales	67,315,274	108,831,463
Manufactured products—		
Fresh cream	12,081,247	—
Tinned cream	1,864,166	—
Cheese—Creamery	13,062,743	6,216,661
Farm	9,293,027	1,901,276
	<hr/> 22,355,770	<hr/> 8,117,937
Butter	4,967,910	2,324,357
Condensed milk	2,806,083	7,556,777
Milk powder	16,181	2,850,813
Other purposes	461,503	20,871
	<hr/> 44,552,860	<hr/> 20,870,755
Add exports	3,931,752	—
Deduct imports	—	7,061,032
	<hr/> Total production	<hr/> 122,811,223
	<u>115,799,886</u>	<u>122,811,223</u>
Secondary manufactures from skim milk and whey, the by-products from cream, butter-making, and cheese-making, were :—		
	1934-35. Gallons.	1944-45. Gallons.
Skim milk to—		
Condensed	107,730	1,889,768
Powder	1,742,173	159,637
Cheese (three-quarter meat)	681,503	—
Casein	—	47,712
	<hr/> 2,531,406	<hr/> 2,097,117
Whey to—		
Powder	—	1,639,891
Condensed (lactose)	—	2,085,070
	<hr/> —	<hr/> 3,724,961
Whey butter	—	<u>651½ cwt.</u>

¹ Provided by the courtesy of the Scottish Milk Marketing Board.

While it would be wrong to assume 1944-45 as a normal year on account of the priorities exercised by the Ministry of Food, it does seem clear that for a period at least by far the greater proportion of the milk produced will be utilised in liquid form. The manufactures, however, except perhaps farm-made cheese which has suffered further diminution, will continue to occupy a place of considerable importance, and provide, as it were, a safety valve to the industry. The utilisation of the by-products, as far as these are available, must also command attention if the fullest return to producers is to be realised.

Concurrent with the changes of the past two or three decades there has grown up in the larger towns and cities an elaborate organisation of private and publicly owned concerns engaged in the processing and distribution of milk. This, indeed, has become a highly specialised business, somewhat of an industrial character and generally regarded as outwith the province of the primary producer. The centre of treatment is the so-called milk depôt, where the milk is pasteurised, cooled, and bottled ready for despatch to the consumer. At least 80 per cent of the cities' milk is processed in this manner. Most modern milk depôts are mechanised in the fullest sense, with equipment designed not only for heat-treating and cooling, but also for such purposes as bottle and can-washing; all of which, for their efficient operation and maintenance, require both skill and engineering knowledge. In addition, incoming and outgoing supplies of milk are usually subjected to some form of laboratory control.

PIONEERING EFFORTS.

Enough has been said regarding the nature of the industry, past and present, to allow not only of a clearer review of dairy educational development, but to throw some light on changes still pending. In earlier days the emphasis was on butter and cheese and less on milk; now the position has been reversed. Dairy farming, however, has always been, and always will be, the essential background to the industry, whatever its diverse forms.

There have been many milestones in the path of progress, and one likes to dwell on these if only for sentimental reasons. Take, for instance, the making of Dunlop cheese, first known in the parish of that name and said to have been introduced from Ireland (this is doubted) about the beginning of the eighteenth century by Barbara Gilmour, a native of the same parish. Perhaps there was little more to the discovery than the fact that whole instead of skim milk was used in the process; yet in the century or more that followed, Dunlop cheese-making was to become the common practice, not only in Ayrshire but much farther afield. And then there is the case of William Harley, a native of Glendevon, Perthshire, who, having acquired a considerable fortune as a cotton manufacturer, turned his attention, among other things, to dairying. By 1814, four years after engaging in this venture, his model byre

at Willowbank, Glasgow (near the head of the present West Nile Street), housed 300 cows, most of the milk of which he sold retail or distributed throughout the city. His ancillary premises included a milk office for receiving and distributing the milk, a large specially cooled room for setting milk for skimming, a churning-house, a scullery, a counting-house, and, not least, two cloak-rooms—one each for the men and women workers. On the question of hygiene, as Mr Harley himself said, “the rule to be implicitly obeyed by the servants was that their hair was to be combed, their hands and face washed, and their dress to be neat and clean. Cleanliness, indeed, was always regarded as essentially necessary in this as well as in every other part of the establishment.” Good advice, even to-day. Before milking, the cows’ udders were washed and dried, quite in keeping with modern practice. But Harley had other claims to fame: he had his own system of milk recording (by measure) and held views on cropping, feeding, and general management that would have earned approval many generations later. Truly a man who lived before his time, but he pointed the way.

Perhaps the next important event was the visit in 1854 to Gloucester, Wilts., and Somerset of a deputation of well-known Ayrshire farmers acting on behalf of the Ayrshire Agricultural Association. Complaint having been made about the quality of the home cheese of the time, these gentlemen were commissioned to study the methods of manufacture of their southern compeers, and to report thereon, with a view to the adoption of any improvements that might have been observed. Following the issuing of the report, which recommended that the Cheddar method of manufacture be given trial in the south-west of Scotland, the Association engaged the services of Mr Joseph Harding of Marksborough, Somerset, himself a well-known Cheddar-maker. Thus, for the first time, itinerant instruction in cheese-making was attempted in Scotland, and while Harding’s stay was not of long duration, it set the copy for further experiment in this direction. Mr R. M’Adam, it is said, introduced Cheddar-making into Wigtownshire at about the same time.

The next step was the formation in 1884 of the Scottish Dairy Association, with branches in the counties of Ayr, Wigtown, Kirkcudbright and Argyll, and in the Upper Ward of Lanarkshire. Impressed by favourable accounts of the Canadian method of Cheddar (factory) cheese-making, the newly formed Association appointed Mr R. Harris, a Canadian, as itinerant instructor. Mr Harris remained for one season only, and was succeeded by Mr R. J. Drummond, also of Canada, who continued in the same capacity (by seasonal engagement) until he became permanent head of the Dairy School at Kilmarnock. Mr Drummond’s attentions were confined mainly to Ayrshire, Lanarkshire, and Argyllshire, instruction in Wigtownshire and Dumfriesshire being given by Mr John M’Master, Culhornmains, Stranraer, and in Kirkcudbrightshire by Mr James Smith, Standingstone, Borgue. The general plan was to hold a

dairy school, as it was called, at certain selected centres for a period of around a week, and then to move on from farm to farm, spending one or two days at each; visits were also sometimes made later in the season to note how far the instruction given had been beneficial.

In its cheese-making activities the Dairy Association was (from 1886) assisted by grant from the Highland and Agricultural Society, whose interest in dairying was sustained from the time of its progenitor, the Highland Society. Commencing in 1796 the Society, then under its original title, awarded a series of premiums, usually annually and on a regional basis, by way of stimulating the making of good butter and cheese, and in some instances for the best-managed dairies. These regions, peripatetically arranged, extended from as far south as the border counties (1823) to as far north as Lerwick in the Shetlands (1837), the award in the latter case being for butter. To Aberdeen fell the distinction of receiving the first premiums for dairy produce at the General Shows—this in 1834. The Society had itself held open competitions in Edinburgh in 1824 (22nd December), 1826 (5th January), and 1827 (3rd January), at the first of which there were twenty-one competitors with exhibits of Dunlop cheese and a type of double Gloucester. Two years later this list had grown to include imitation forms of North Wiltshire, Cheshire, and Stilton. Many years had still to pass before the appearance of the Cheddar, and even then and for a considerable time afterwards this variety was regarded as “imitation”—that is, imitation English Cheddar.

It is not without interest to note that as early as 1884 the Highland and Agricultural Society had a working dairy at its Edinburgh Show of that year. Similar demonstrations were given in butter and cheese-making at Aberdeen Show in 1885 and at Dumfries Show in 1886.

With regard to butter-making the position was far less happy. In 1884 the Scottish Dairy Association, following the same lines as for cheese-making, appointed as instructor a Mr Chilton from London, but without evident success. Denmark was then coming to the fore as a butter-producing country, and reckoning this as possibly the best source of technical knowledge at the time, the Association in 1885 engaged the services of a Dane, a Mr Segelcke. Unfortunately the language difficulty was such that little profit was derived from the latter's instruction, and as a consequence the effort in this direction was allowed to lapse.

The year 1888 brought a fresh prospect of development in dairying with the presentation to Parliament of The Minutes of Evidence of the Departmental Commission on Agricultural and Dairy Schools. Appointed “to inquire into and report upon Agricultural and Dairy Schools in Great Britain which may properly receive Government Grants,” this Commission, under the Chairmanship of Sir Richard Paget, M.P., accepted evidence during the previous autumn from a wide range of public bodies and private individuals, the former including a deputation from the Highland and Agricultural Society. The Society recommended the establish-

ment of one agricultural college, with experimental farm, near Edinburgh, and, this proving successful, the addition of two more—one near Aberdeen and the other near Glasgow; also that the colleges be supplemented by one or more dairy schools not necessarily affiliated to them. Other views put forward by individual Scottish representatives were that (a) a dairy training centre be located near Glasgow and (b) a butter-making school only be located there, but that there be two cheese-making schools in the south-west—one for Ayrshire and Dumfriesshire and one for Wigtownshire and Kirkcudbrightshire. There was general agreement as to the desirability of continuing the itinerant system of instruction in cheese-making, and all pressed the need for Government assistance if centralised training was to be brought within reach of the poorer members of the agricultural community.

Compared with the position in many other countries, dairy education in Great Britain was at that time singularly backward, and at only a few centres in England, some of them privately owned, were residential courses available; even these were regarded as quite inadequate. The models generally taken to be aimed at were the Munster and Glasnevin schools in Ireland, both of long standing, and providing, *inter alia*, regular and systematic courses in dairying for female students. The course at Glasnevin, which was more or less similar to that at Munster, covered three sessions of two months each, and included in its curriculum—

- “ 1. Instruction in the principles of feeding cows, calves, pigs, and of the treatment of milk and its products, poultry and their management.
2. The practice of dairy work. The making of butter and cheese in large and small dairies with improved machinery and implements as well as by ordinary appliances.
3. Instruction in plain cooking . . . given on three days of each week, according to an approved programme, by a skilled teacher.”

Most of the European countries had State-aided dairy schools by then, these, in many cases, awarding diplomas after a successful period of study. In America, on the other hand, there were no dairy schools as such, but dairying was taught at a number of the State Colleges of Agriculture, where it usually formed part of a longer agricultural course. The Ontario Agricultural College at Guelph had also by this time developed a special dairy section, evidently one of sufficiently high standing to be quoted by some of the Scottish witnesses before the Commission as an example worthy of emulation.

CENTRALISED INSTRUCTION.

The following year, 1889, saw the founding of the Scottish Dairy Institute. Agreement having been reached between the various branches of the Scottish Dairy Association and other

interested parties as to the desirability of having a single, centrally placed institute, steps were set on foot to secure a lease of the dairy premises at Holmes Farm, Kilmarnock. This achieved, and with the necessary appliances installed, the new Institute was opened forthwith under the direction of Mr R. J. Drummond, until then itinerant instructor in cheese-making. Milk was purchased locally—from Holmes Farm and from other adjoining farms—and for a time the instruction was wholly practical; later, lectures on the theory of dairying, in botany, and in chemistry were given by the staff of the Agricultural Department of Glasgow Technical College. Funds for the support of the Institute were derived from subscriptions and County Council grants, with, in addition, a small Government grant; students' fees and sales of produce also contributed substantially towards its upkeep.

Despite its limitations as to space and convenience, and the fact that the lectures had to be given elsewhere in Kilmarnock, the Institute functioned with considerable success in the old farm buildings for fifteen years—that is, until the opening of the new Dairy School close by in 1904. By this time it had become part of the structure of the West of Scotland Agricultural College—by amalgamation in 1889 with the Agricultural Department of Glasgow Technical College—and been renamed the Dairy School for Scotland. The change of name was given effect to in 1902 following an arrangement between the three Scottish Agricultural Colleges, the Highland and Agricultural Society, and the Scotch Education Department.¹

The new school, built after visits had been made to a number of English training centres, typified the needs of the time. The cheese and butter-making sections were greatly extended, the former with additional accommodation for the making of blue-veined and soft cheese, while there was also a room set aside for cream separation and the regenerative pasteurisation of milk intended for butter-making. A large lecture-room and two laboratories were included, as well as the usual offices and cloak-rooms. Opened on the 11th June 1904 before a large and distinguished gathering of agriculturists, the new school, perhaps more often to be described as the Kilmarnock Dairy School, was soon to make its influence felt far beyond the confines of its functional area.

Two points of more than passing interest occurred during the following year: first, the institution of a private system of milk recording at Holmes Farm; and second, the payment on a fat-percentage basis of milk purchased by the school. The special winter four weeks' courses were also initiated during the same year.

THE ADVENT OF PROFESSIONAL QUALIFICATIONS.

Here it is necessary to revert slightly in order to trace the subsequent academic developments. The earlier courses at the Institute were all of short duration, eventuating at the most in certificate awards. The need for a diploma was felt, and to give

¹ The then title.

effect to this the "Highland" and its sister Society in England the "Royal," jointly instituted the examination for the National Diploma in Dairying—the N.D.D. as it has come to be widely known. With Reading and Kilmarnock as the respective centres for England and Scotland, the first examination was held in 1897,¹ and covered the subjects of General Dairying, Cheese-making, Agricultural Chemistry, and General Agriculture. Practical skill in dairying was assessed by the candidate's ability (1) to milk, (2) to churn and make into butter a measured quantity of cream, and (3) to make one cheese of each of the following varieties: (a) hard-pressed, of not less than 30 lb.; and (b) veined, or blue-moulded, of not less than 10 lb.; and also to make one or other of the following soft cheeses—Pont l'Évêque, Jervais, Coulommier, Camembert. In addition, candidates were obliged to show proof of their capacity for imparting instruction to others, a condition no doubt desirable at the time when teachers in dairying were urgently needed, but which was in later years (after 1926) deleted.

Seven candidates gained the N.D.D. at this, the first national examination in dairying held in Scotland.

The examination then was "external" in the fullest sense, except in venue. Two years later, however, as a preliminary to acceptance, candidates were required to "produce satisfactory evidence of having taken part in practical work upon a farm for a period of not less than twelve months, three months of which (might) have been spent at a Dairy Institute."

It was not until 1902 that the Scottish Agricultural Colleges were given powers to grant diplomas. Since then the West of Scotland College, by arrangement with the other two Colleges, has awarded a diploma in dairying, this being described shortly as the C.D.D. and covering much the same ground as for the N.D.D. Students as a rule endeavour to earn both qualifications.

Throughout the years that followed, and in an effort to keep pace with the changing needs of the industry, the national examination was variously modified, both as regards conditions of entrance and subjects of study. By 1914 the written work consisted of papers on (1) General Management of a Dairy Farm, (2) Management of Dairy, and (3) Chemistry and Bacteriology; while under new regulations introduced that year candidates were required to produce certificates testifying, first, as to their institutional training in practical dairy work, now set at a minimum of six months; and second, that they had attended approved courses in Chemistry, Bacteriology and Botany, and had satisfied the authorities of the institution of their fitness for admission to the examination. A further regulation, operative the following year, required candidates to have spent at least six months on a cheese-making farm; this was altered later to read "an approved dairy farm."

The Regulations and Syllabus were next revised for the 1927 examination, the main change under the former requiring that candidates should have satisfactorily "attended a Diploma Course

¹ In point of fact, the Royal Agricultural Society had conducted a similar examination in 1896.

in the subjects of the Examination covering two academic years at an approved Dairy Training Institution," this including "six session months' instruction (consisting of not more than two periods) in practical dairy work." Alterations in the Syllabus affected the number and grouping of the subjects of the written examination, and instead of three papers as formerly there were now seven—viz.: Dairy Farming, Dairy Hygiene, Principles of Dairying, Dairy Factory Management and Dairy Engineering, Chemistry (General and Dairy), Dairy Bacteriology, and Dairy Book-keeping. The practical examination remained as before.

The new Syllabus, indicative no doubt of the trends of the time, but involving seventeen hours of written work and a further three days of practical, cast a heavy burden on the candidates, the more so since the national examination followed close on the heels of its College counterpart, the C.D.D. Moreover, many of the candidates found it difficult, in the stress of a comparatively short period of study, to master the ever-growing mass of detail associated with factory management and engineering, subjects with which they had generally little outside practical contact. To overcome this an option was introduced later, permitting candidates to sit the examination in two parts, beginning with the practical section and the first four subjects mentioned above. Despite this seeming advantage very few availed themselves of the option, for the very good reason that although the examination itself had been rendered physically easier, the leading-up studies necessarily remained largely as before; besides, delay in passing meant delay in earning and a greater outlay, and, naturally, most students were optimistic enough to hope for the best. In any case, a group pass, allowed when the failure did not exceed three subjects, was as good as a pass when the option was exercised.

A further revision took place preparatory to the 1940 examination, the aim this time being to eliminate Factory Management and Engineering as a specific subject, but to retain, under other headings and in more general form, certain of its contents. A new set of papers was drawn up: Dairy Husbandry, Milk and Milk Plant, Cream and Butter, Cheese and Cheese Products, Dairy Chemistry, Dairy Microbiology (an elaboration of Bacteriology), and Dairy Book-keeping. The Regulations governing the acceptance of candidates were also amended, each candidate being required to produce, through the Head of the College or Institute, a statement as to his or her general educational attainment and fitness for admission to the examination. A certificate testifying that the candidate had satisfactorily completed courses in (i) soils, crops, rotations, cultivations, manuring of crops (other than pasture), and plant physiology, and (ii) elementary chemistry, physics and mechanics, as well as a further certificate of proficiency in soft cheese-making, were laid down as preliminaries to acceptance.

This revised Syllabus has now been in operation for six years, and cannot be said to have been wholly satisfactory. The range of study—at anyrate within the normal duration of the course—

is still too wide, and the examination itself only slightly less burdensome (by one hour) than before ; the latter advantage has probably been more than offset by the fact that there are now seven examiners instead of six. To continue as at present a longer course would seem essential—a course including not only six months spent on an approved dairy farm, as is required by the Regulations, but a like period spent in a creamery. Only then could a candidate be regarded as properly equipped to meet the full demands of the Syllabus.

VIEWS AND COUNTER-VIEWS.

In the early days of dairy training the position was clear and simple, and the N.D.D. Examination, based on farm practice, provided a fitting measure of proficiency. The course and qualifications were ideal at the time ; but with the development of milk processing and creamery manufacture and the decline of farm cheese and butter-making an uneasy compounding crept in, in which an attempt was made to serve both educational interests simultaneously. Up to a point this was reasonably successful, neither side being as yet overloaded. The portents, however, were visible, although perhaps for a time not clearly ; hence the repeated efforts directed towards the improvement of the training and Syllabus. Both sides, dairy husbandry and milk production on the one hand and milk processing and the manufacture of milk products on the other, have made rapid strides in recent years, and it is the considered view of many critics of the present educational system that they should be dealt with separately, irrespective of the length of course or the particular qualification ultimately to be earned.

It was hoped that this issue would be clarified in the recent reports on Agricultural Education—the Luxmoore for England and Wales and the Alness for Scotland—but no precise lead was given. The Luxmoore Report disclaimed any interest in dairying beyond the limits of milk production, leaving unsettled the wide field of processing and manufacture ; while the Alness Report, adopting the term dairying in its usual generic sense, made no mention of the sectional needs of the industry. The former drew on the analogy of wheat growing and milling, holding that the distinction of function embodied in these operations applied equally as between milk production and milk processing and manufacture, and that the latter could not, strictly speaking, be regarded as coming within the ambit of agriculture. This may indeed be true and convenient from the standpoint of agriculture as a subject of study, but it does nothing to solve the problem that confronts those whose business it is to provide degree, diploma, or even short courses in dairying. It merely implies that milk processing and manufacture, being beyond the scope of the producer, should be treated separately from an educational point of view, an implication which, though sound enough in itself, raises doubt as to the legitimacy of such a training being given under the ægis of an agricultural college. It also

overlooks the fact that the processor and manufacturer, if he is to know his job thoroughly, should be familiar with the methods of handling milk on the farm; in other words, that to some extent the two interests should overlap. As regards dairy husbandry, the producers' end of the industry, as it were, it can be claimed with equal force that this should likewise form a specialised study; such, in short, is one of the recommendations of the Alness Committee.

Between the issuing of these Reports a new organisation came into being, the Society of Dairy Technology, which has the following avowed objects:—

- (a) the advancement of dairy technology in all branches of the industry by the dissemination and application of knowledge gained from experience and experiment;
- (b) the provision of opportunities for discussion and collaboration between persons interested in improving the technical practices of the dairy industry;
- (c) the encouragement of technical education for persons working with milk and its products;
- (d) the encouragement of scientific inquiry into problems arising in the milk industry.

Various sections, including a Scottish section, have since been formed, the membership covering all branches of the industry—distribution, manufacture, engineering, advisory and education, research, production and marketing, public health, and sanitary inspection. Periodic meetings are held, and papers of practical and scientific interest read and discussed. Among its other activities the Society set up an Education Committee to consider and report on "the present and post-war educational needs of the industry." This Report, issued in May 1945 and regarded by the Committee as generally complementary to the Luxmoore Report, deals chiefly with the technological as distinct from the farm production side of dairy education. Existing courses and qualifications are reviewed and suggestions for improvement made.

The main criticism in the Society's Report is levelled against the present-day diploma courses, in that they attempt to embrace all aspects of dairying, whatever the needs, and impose on all students, farm and factory alike, the necessity of taking a common and, in some respects, superficial course of training. A process of bifurcation after the first year's basic training is suggested, which would enable trainees to specialise during the second and concluding year of the course and be thus better fitted for the vocation to follow.

The Committee also recommends the wider establishment of degree courses in Dairy Science, with, in addition, post-graduate courses in special subjects such as, for instance, Dairy Bacteriology; they suggest also that the Universities concerned "might consider the possibility of a second option to enable undergraduates or graduates to specialise in Dairy Husbandry as an alternative to Dairy Science." Commenting on the degree course at Reading, instituted in 1926, and on consideration being given to the same

project by the University of Wales, the Committee alludes to Glasgow University and the West of Scotland Agricultural College as no less well adapted for the teaching of dairying, and suggests the desirability of these two bodies formulating similar degree courses. Here, it may be mentioned, the question is not a new one in West of Scotland circles, and although the University has not as yet given much encouragement to approaches that have been made, the tightening bond of interest between the College and the University adds a gleam of hope for the future.

Besides dealing with whole and part-time courses in dairying and the necessity of having one or more centres—Technological Institutes, as they are called—adequately equipped to meet all teaching needs and to provide facilities for research, mechanical or otherwise, the Society's Report raises a point about which there are bound to be varied views. As previously mentioned, the N.D.D. was instituted jointly by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland, the Board of Management, known as the National Dairy Examination Board, being composed of an equal number of members from each Society. Only later was the Board extended to include nominees of the British Dairy Farmers' Association. The suggestion now made is that should the twin-type N.D.D. be adopted the time would seem opportune to reconstitute the Board so as to include representatives of the Ministry of Education, the Ministry of Agriculture, the Milk Marketing Board, and of the teaching centres and the organised milk distributors and manufacturers. (One trusts that the Scottish counterparts of these bodies would not be overlooked.)

While it is true to say that the British Dairy Farmers' Association was admitted to membership on the Dairy Examination Board on the grounds of expediency—to remove redundancy of examination at Reading—a precedent has been set which cannot logically be resisted if the examination is to retain its appeal to all branches of the industry. The N.D.D., as indeed all external examinations, may tend to become less popular as time goes by, especially if degree courses are more widely introduced and College diplomas redesigned, and it seems not unreasonable to suppose that the counter to this lies in an extension of the representation on the National Dairy Examination Board. The "Royal" and the "Highland" would no doubt wish to remain the senior partners—their record entitles them to hold this viewpoint—but the place occupied by the British Dairy Farmers' Association might well be shared by other representative bodies, even if only in an advisory capacity.

The Report of the Education Committee of the Society of Dairy Technology has perhaps more of an English than a Scottish flavour to it, and deals with the subject in too broad outline to be other than of general guidance. More detail is required, particularly as regards the contents of the courses prescribed, and not inappropriately the Scottish branch of the Society, mindful of its own regional interests, has set up a Sub-Committee to go further into the matter. It is hoped through this to present a picture of Scottish

needs, degree as well as diploma, and short-term courses of both institutional and extra-mural type.

The most recent pronouncement on agricultural education,¹ prepared by a Committee under the Chairmanship of Dr T. Loveday, takes the same line in respect of dairy technology as did the Luxmoore Committee—namely, that the distribution of milk and the manufacture of milk products are “no more a part of agricultural activity than those (the functions) of any other branch of food manufacture and distribution.” But it does go a little further in stating “that training in dairy technology should not be wholly divorced from training in dairy husbandry,” and that “if a national technical institute (proposed by the Society of Dairy Technology) were to be set up, it would be desirable for it to be situated where staff and students would have opportunities of regular contact with agricultural teaching and research.” These matters it commends “to the consideration of the authorities responsible for the provision of higher technical education for industry.” Does this suggest that some sort of compromise is visualised which would permit of dairy technology being retained within the structure of the existing training centres, but subject to the direction of certain selected Technical Colleges or to a national body such as the National Council of Technology proposed in the Percy Report on Higher Technological Education?

The Loveday Report is critical of the National Diplomas in Agriculture and Dairying because “of the cramping effect that any external examination must have on the development of teaching in accordance with the evolution of the subject and the needs of the students,” and recommends their abandonment. It also regards as unsatisfactory the suggestion that degree courses in dairy husbandry and dairy technology could be arranged by a simple bifurcation in the last year of a three years’ course of training, but does not say whether there is the same objection in the case of corresponding diploma courses covering only two years. For dairy husbandry a course in agriculture (degree or shorter course as preferred) is recommended, with a bias towards dairy farming and supplemented by experience on a good dairy farm.

A NEW N.D.D.

Undoubtedly dairy education has reached the academic cross-roads. The National Dairy Examination Board is fully aware of this, and through a Sub-Committee is at present giving thought to the matter. The principle of the twin-type N.D.D. has been accepted, and when the Regulations and Syllabus appropriate to each have been completed they will be submitted for study and, if need be, adjustment to the various teaching centres concerned before being presented for final approval to the parent bodies. It is as yet too early to give details of the changes proposed, except

¹ Report of the Committee on Higher Agricultural Education in England and Wales (1946).

that, as between the two sections of the examination, there will be an almost complete divergence in subject-matter and in required practical attainment. The subjects suggested for the respective sections are as follows :—

Diploma in Dairy Husbandry.

- (1) Dairy Farming, including Farm Buildings and Machinery.
- (2) Dairy Cattle—Breeding, Feeding, and Management.
- (3) Economics and Accountancy.
- (4) Animal Health.
- (5) Dairy Microbiology.
- (6) Physics and Chemistry.

Diploma in Dairy Technology.

- (1) Dairy Factory Buildings and Equipment.
- (2) Milk Processing and Distribution and the Manufacture of Dairy Products.
- (3) Organisation of the Milk Industry and Factory Management.
- (4) Economics and Accountancy.
- (5) Dairy Microbiology.
- (6) Physics and Chemistry.

Contrary to the findings of the Loveday Report, the Sub-Committee takes the view that while there is much in common as between agriculture in the general sense and dairy husbandry, the latter merits a measure of specialisation that cannot adequately be given in a two years' diploma course in which an attempt is made to cover all branches of agriculture; furthermore, that there is a demand, in England at anyrate, for personnel so trained. To this, it may be added, a training in dairy husbandry may also appeal more to women students—hitherto, as students of dairying, more numerous than men—than a more generalised course in agriculture.

SECTIONAL NEEDS.

It is not the intention to discuss here the educational requirements and professional qualifications necessary for potential teachers or advisors in either dairy husbandry or dairy technology. These are matters worthy of separate consideration, involving in the generality of cases the taking of courses of University standard. This, however, may be said: no training in dairy technology could be regarded as adequate unless it included, in addition to "dairying" and its basic sciences, chemistry and bacteriology, a fairly full study of all relevant aspects of engineering. By far the larger number of trainees of the future will be engaged directly in the two branches of the industry, either as employers or employees, and it is to these—dairy farmers, dairy workers, and creamery personnel—that dairy education must for the most part be directed.

THE DAIRY FARMER.

However desirable a degree training (albeit in dairy husbandry) may be for the teacher, the advisor, and the administrator, the fact is that farming is not an exclusive occupation, and that for the vast majority of potential farmers something of lesser calibre must suffice. This is a point too often overlooked and not sufficiently emphasised in official reports on agricultural education. The level of farming—and this applies to all systems—is more likely to be improved by the up-grading of the many than by the erudition of the few: by a process of building up rather than of filtering down. There is, of course, room for the graduate who does not suffer defection into professional circles, as has too commonly been the case; but there are others, infinitely more numerous, for whom a shorter course is the only alternative. Whether such a course should be of two or one year's duration, or of one month only, is beside the point; the choice will depend on individual circumstances and inclination. The main thing is that young farmers should be encouraged to attend these courses, long or short, and that they should regard them as a necessary complement of their practical experience. No course, it may be said, is too short not to be beneficial; yet the same course extended may be more than proportionately better.

While agreeing that the dairy farmer must possess a good all-round knowledge of general agriculture, one must recognise that his outlook and application make of him a specialist in a very real sense. To him cropping, important and necessary though it be, is incidental to the main purpose—milk production; for it is by his skill and efficiency in the latter direction that his success is ultimately measured. He must needs have a wide knowledge of breeding, feeding, and the care and management of dairy stock generally, and be conversant with every detail of byre and dairy routine. His supervision must rest largely on the fact that milk production necessitates the closest personal attention, and embraces considerations of hygiene unparalleled in any other branch of farm practice. Admittedly much of this he may acquire by experience, but there is no gainsaying the advantage to him of a knowledge of the "whys" and "wherefores" without which his hard-earned experience must remain meaningless; indeed, only through this fuller understanding can his experience reach its just fruition. On the other hand, no amount of scientific knowledge can compensate for a lack of experience; the two must go together, each the complement of the other.

In addition to his farming background, the prospective student should possess a reasonably good general education, especially if he intends to take a long-term College course. Given this he will be better able to assimilate the more scientific side of his studies and take a fuller part in College life. The probability is that he will embark on a one or a two years' course in agriculture, as most do, capping this off, perhaps, with a short course in dairying.

This provides a good foundation—good at anyrate from the general standpoint. Many critics believe that a more specific course dealing with “dairy husbandry” or “agriculture with a bias towards dairying” would be preferable. Certainly there should be some degree of selectiveness in at least the later stages of training to meet the divergent interest called for in connection with dairy farming.

Mention has already been made of the proposed change in the N.D.D. examination, and here it may be not inappropriate to give that part of the Syllabus relating to two of the papers: Dairy Farming, and Dairy Cattle—Breeding, Feeding, and Management. The details are as follows:—

DAIRY FARMING.

Dairy farming in relation to general agriculture; development and distribution; types of dairy farms; selection, stocking, and equipment of typical dairy farms; labour and organisation.

Buildings suitable to different conditions; general lay-out; cowsheds, yards, and milking sheds; milking bails; accommodation for bulls, calves, and young stock; water supply; sanitation; requirements for graded milk production; barn and dairy equipment.

Crops for dairy farms; pastures and ley management; suitable seed mixtures and costs per acre; selection of cereal, leguminous, root, and forage crops; acreages required and suitable rotations; general principles of tillage, manuring, and harvesting applicable to the chief crops; silage crops and the making of silage; approximate costs of production of the chief crops; grass drying.

Cost of milk production; records which should be kept as a guide to management.

Sale of milk by wholesale and retail; legislation affecting milk production and sale; circumstances on the farm which affect the yield and quality of milk; graded milk production; payment according to composition, and premiums for graded milk; cleaning and care of milking machines and other utensils.

Pigs in relation to dairying; suitable breeds for bacon and for pork production; housing accommodation; breeding, feeding, and general management.

DAIRY CATTLE—BREEDING, FEEDING, AND MANAGEMENT.

Important conformation points and features of the dairy cow; indications and measurement of production; history of milk recording; British methods of milk recording and fat testing.

Breeds kept for milk production; chief characteristics and suitability for different conditions; types of dairy herds; home-bred herds and their advantages; flying herds.

Principles applied to the breeding of dairy stock; hormones in relation to breeding; pedigree and non-pedigree stock; herd-books and grading up; defects of indiscriminate crossing; use of

milk records in breeding ; registers of merit and advanced registers ; progeny testing and bull indexes ; artificial insemination and its place in live-stock improvement ; selection and management of bulls.

Feeding of dairy cows ; principles and practice of feeding for maintenance and production ; feeding standards ; mineral and vitamin requirements ; chief characteristics of home-grown and purchased foods ; essentials of a good ration ; rations for winter and summer on different types of farms ; approximate costs of different rations.

Calf-rearing ; different methods ; use of other foods to replace milk ; rearing and feeding of bull calves ; rearing, feeding, and management of dairy heifers ; approximate cost of rearing.

Secretion of milk ; hormones in relation to milk secretion ; milking by hand and machine ; importance of good milking.

Herd management in general ; regulation of calvings for level and seasonal production ; records essential to good herd management.

A somewhat elaborate account, some may think, but it does show the emphasis placed on the dairy husbandry aspect of agriculture.

THE DAIRY WORKER.

Hardly less than the farmer himself, his byre and dairy workers stand to profit by instruction—this time perhaps more in the elements of good practice than by scientific explanation. This applies particularly to those engaged in milking and in the washing and cleansing of dairy utensils, and who must, above almost everything else, possess some appreciation of the meaning and practice of hygiene. One would like to see more done for this class of worker, even if it merely meant giving them an occasional lecture-demonstration ; better still, such instruction might be provided in the form of short institutional courses run on the same lines as the farm cheese-makers' courses of earlier days. In the latter connection two things would seem to be essential : first, the co-operation and, possibly, the assistance of employers ; and second—this for psychological reasons—that these courses be held specifically for farm dairy employees only, actual and potential. Apart from any question of educational advantage, such a step would probably lead to an increased recruitment of those workers of which the industry is at present in such dire need.

CREAMERY PERSONNEL.

Within the past few decades a new field has been opened up, resulting in an increasing division of function between the various branches of the industry. Fewer producers now sell direct

to the public, and milk once handled untreated by the small city and town dairy is now, for the most part, first assembled and processed in bulk before distribution to the consumer or to those still engaged exclusively in retail business. Thus have come into being the so-called milk depôts, mechanised to cover all phases of treatment and organised more or less on an industrial footing. Concurrently there has been a switch over from farm cheese and butter-making to centralised manufacture and, more recently, the establishment of milk condensing and drying factories. All, according to their size and needs, have their staffs of technicians, engineers, and laboratory workers.

In the new and extended structure of the dairy industry it may well be said that each side is complementary to the other, the more so since the producers' interest is largely maintained through the Milk Marketing Boards, who themselves are processors and manufacturers on a considerable scale. Likewise the general body of processors and manufacturers, receiving their milk direct from the farm, are concerned with the standards of production, quality as well as quantity. It follows, then, that each side is all the better for knowing something of the other's problems.

As has been mentioned before, milk processing and large-scale manufacture are not regarded as coming within the educational scope of either agriculture or dairy husbandry. They enjoy no official status in this respect, although by a process of natural growth they have been grafted on to the curricula of a number of dairy-training centres and have featured in both College and National Diploma Examinations in Dairying. But as yet they are inadequately catered for, despite their public importance and the not inconsiderable demand for instruction of this type and for trained personnel.

To those acquainted with this branch of the industry the educational requirements are clear. For the top-grade posts—managerial and scientific—a training of degree standard is considered desirable by way of preparation. Graduates in pure science may also find a place, as they do at present in some of the larger concerns, in advanced laboratory work; but in general the need will be for candidates who have specialised in dairy technology and possess the necessary scientific background. There will also be room for those of diploma standard, even at the top if their experience and personal qualities merit it, and for trained engineers.

In addition to the above are the technicians (plant operatives, cheese-makers, &c.) and milk testers, all requiring skill and knowledge sufficient for their separate functions. True, these mostly work under direction, but in most cases also they carry considerable responsibility, and may easily, through ignorance or carelessness, affect the efficiency of the plant or mar the finished product. The need for instruction here, though of different type and of short duration, is no less important than it is for those of higher category.

At only two centres in the British Isles—Reading and Cork—are degrees in dairying offered, the former occupying three years and the latter four. In Scotland (Glasgow) the nearest approach

to this is an honours degree in agriculture terminating in a group pass in "Agricultural Bacteriology and Bio-chemistry with special reference to Dairy Technology," but so far no one has considered it worth while taking this course. Something more specific is needed, and no doubt the present deliberations of the Scottish section of the Society of Dairy Technology will lead to suggestions being made towards this end.

It may be of interest at this point to refer again to the proposed new Syllabus for the N.D.D. In the Dairy Technology section the following three papers, still in draft form, are included :—

DAIRY FACTORY BUILDINGS AND EQUIPMENT.

Construction and Arrangement of Factory Buildings.

Selection of the site, design, and dimensions of country collecting and manufacturing plants, town pasteurising and bottling depôts. Building materials. Lighting; ventilation; air conditioning; water-supply; drainage; sewage disposal.

The Equipment of Dairy Factories.

Boilers and steam raising; prime movers; use of electricity; mechanical refrigeration and cold storage as used in dairy factories; materials used in construction of dairy plant. The design and construction of plant and equipment used for transporting, receiving, processing, and bottling of milk and for the manufacture of cream, butter, cheese, condensed and dried milks, ice-cream, processed cheese, and casein. Precision control, thermometers and thermographs, thermostats. The lay-out of dairy plant and equipment for specific purposes. Methods of cleaning plant and equipment. Detergents and water softeners.

MILK PROCESSING AND DISTRIBUTION AND THE MANUFACTURE OF DAIRY PRODUCTS.

Milk.

Secretion, composition, and properties. Standards, chemical and bacteriological. Grades of milk. Bacterial flora; pre-pasteurisation requirements. Principles and practice of pasteurisation and sterilisation. Bottling. Cartons. Distribution. Detection, prevention, and remedy of faults. Special treatment of milk; homogenisation, irradiation, &c.

Milk Products.

Production of fresh, pasteurised, and sterilised creams. Maintenance and control of starters for butter and cheese-making. Manufacture of sweet, ripened, and neutralised cream butters; all British and the principal foreign varieties of hard-pressed cheese; blue-veined and soft cheese; condensed, evaporated, and

dried milks; dried whey; processed cheese and casein. Manufacture of ice-cream; powders and mixes. Cold and cool air storage of butter and cheese. Cheese ripening. Butter blending and packing. Canning of condensed and evaporated milks and the packing of dried milk under inert gas and vacuum. Factory control of quality. Faults, detection, prevention, and remedy. Grading and judging of dairy produce. Score cards. Legal and trade standards for dairy produce.

ORGANISATION OF THE DAIRY INDUSTRY AND FACTORY MANAGEMENT.

Organisation.

History of the dairy industry. Relative importance of dairying in the farming economy of Great Britain. Home production and utilisation of milk and milk products. Volume and sources of imports of dairy produce. The marketing of milk and dairy produce. Price regulation. Producers' Boards; Manufacturers' Boards and Associations; Trade Boards.

Factory Management.

The Factory and Workshops Act, Sale of Food and Drugs Act, and legislation affecting milk processing, manufacture, and relations between management and staff. Labour: engagement, control, and organisation. Factory records to cover receipts of raw materials, output of finished goods and by-products, and costs of production. Use of the laboratory to control technical efficiency.

Compared with the Syllabus prescribed for Dairy Farming and Dairy Cattle, &c. (given earlier), the above papers show an almost complete divergence in subject-matter and an obvious need for separate treatment during at least part of the period of study.

One must not lose sight of the fact that in Scotland alone some thousands of persons are employed directly in large-scale dairying, and that of these at least three-quarters are engaged in milk processing and its ancillary operations. Only in the case of creamery cheese and butter-makers has organised instruction been provided, this by means of short winter courses held periodically at the Dairy School, Auchincruive; nothing has yet been done to meet the needs of the larger mass of other workers, many of whom would benefit were properly designed courses available. Extra-mural courses would, in part, be necessary, but selected candidates might more advantageously attend short institutional courses dealing specifically with milk processing and the other functions of the creamery.

TRAINING FACILITIES.

At present the three Scottish Agricultural Colleges accept students desirous of obtaining the National Diploma in Dairying, the normal course consisting of two winter sessions spent in College and two summer sessions at the Dairy School, Auchincruive. Students are also required to spend not less than six months on not more than two approved dairy farms. There is no obligation to acquire creamery experience, although a number do so after completing the necessary farm qualification.

The winters' studies consist of the basic sciences, together with agriculture, veterinary science, and book-keeping; the summers' sessions are confined to dairying—theoretical and practical—with additional lectures in chemistry and bacteriology. The N.D.D. examination, as likewise the concluding stage of the College diploma examination, which most of the students also sit, takes place at the end of the second summer session. This arrangement has worked reasonably well in the past, although in certain subjects there has been a marked lack of uniformity in the instruction given at the various centres, sufficient, at anyrate, to suggest the desirability of a greater degree of centralisation after the first winter session.

The requirements of farm dairy and creamery workers are not overlooked, these being accepted at the Dairy School for short-term training during the months of January and February. This type of course, especially in the case of creamery workers, could, it is believed, be greatly extended. The North of Scotland Agricultural College at its Craibstone centre also provides short courses, but on a smaller scale, at various periods throughout the year.

Should the study of dairying develop along the lines previously discussed—*i.e.*, as dairy husbandry and dairy technology—an entirely new educational structure would be necessary.¹ Students taking the former would presumably concentrate more on milk production than in the past and spend a shorter term within the Dairy School. On the other hand, those taking dairy technology would require, in addition to cheese-making and butter-making and the customary elements of a practical training, a much greater opportunity of handling milk in liquid form—that is, of processing, bottling, &c.—and of acquiring a working familiarity with plants of different type. For this purpose the Dairy School would require to be re-equipped and, if need be, run as a commercial milk-treating establishment either independently or in conjunction with some other body; so equipped, it could provide the diversity of training necessary for the various categories of creamery workers. (During the war years the peak intake of milk was around 1000 gallons per day, mostly made into cheese.)

Whatever views may be held regarding the Alness Committee's recommendation that each of the Scottish Colleges should specialise in the later stages of training, the fact is that so far as dairy tech-

¹ Representatives of the three Scottish Agricultural Colleges are at present considering this matter.

nology is concerned there could be only one choice of venue—namely, the west—where dairying is the dominant type of farming, where the creamery system is most highly developed, and where, within easy reach of each other, are the Dairy School and the Hannah Dairy Research Institute. Almost equally it could be argued that dairy husbandry should be similarly located, partly because of the presence of the two institutes mentioned, but perhaps mainly by reason of the wide experience of the West of Scotland Agricultural College in the past teaching of this subject.

As a finishing note it may be permissible to claim some considerable success for Scottish dairy education in the past. The Kilmarnock Dairy School was pre-eminent in its time and served its purpose well, many of its trainees distinguishing themselves in the wider spheres of dairying. The present Dairy School at Auchincruive, opened in 1931, enjoys many advantages—in site, size, and equipment as compared with its predecessor—and passes through its portals a larger number of students than any other dairy training institution in Great Britain. In the N.D.D. alone its record of awards during the fifteen years of its existence amounts to approximately 40 per cent of the total list of passes, and yet it is but one of at least half a dozen centres which prepare candidates for this examination. Its potentialities are greater now than ever; all that is awaited is a clarification of the present educational position and an indication of future needs.

Lilithgow Library.
Imperial Agricultural Research Institute,
New Delhi.

INSECT AND OTHER PESTS OF 1945.

By A. E. CAMERON, M.A., D.Sc., F.R.S.E.,
Consulting Zoologist to the Society.

INTRODUCTION.

As was the case in 1944, the activities of insect and other pests expressed in terms of crop damage were more or less normal. A notable exception was the Leather-jacket or grub (*Tipula paludosa*), which maintained the high level of infestation of cereal crops and grassland that has characterised its depredations since 1910. As was remarked in the 'Transactions' of last year (p. 68), it is the kind of weather during autumn which is the critical factor in the survival of the young grubs hatched from eggs laid in the soil of grassland in August and September. Should dry conditions then prevail, the chances of an outbreak the following year are greatly reduced, and, since Scotland was generally favoured by warm dry weather throughout the whole of the harvest season of 1945, the prospect is that the Leather-jacket will be less of a menace to farmers in 1946 than it has been for some years.

To crops such as cereals, sugar-beet, and flax which have been subject in recent years to severe grub attack there is now added beans which were badly damaged in two localities of the Lothians in May 1945.

The Potato Root Eelworm (*Heterodera rostochiensis*) continues to occupy the minds of all concerned with the health of the Scottish potato crop, and a measure of this anxiety is reflected in the attention now being paid to the pest in the routine annual inspection of the growing crop under the Potato Certification Scheme of the Department of Agriculture for Scotland. Indications are that there has been a material increase of potato sickness in some districts which were once considered to be clean or but slightly affected. On one farm in the east of Scotland visited by the author in September 1945, where crops of Epicure and Great Scot were found to be heavily infested, it was the owner's opinion that the disease had been introduced in recent years in cyst-infested sacks brought by potato-picking squads from potato-sick farms in the west of Scotland. If this view is correct, there is need for the exercise of the utmost care in the disposal of soil-residues from merchants' sacks so as to reduce the risk of disseminating infective cysts on clean farms.

in Another eelworm which appears to be on the increase is that which attacks the roots of oats (*Heterodera major*), and is closely related to this matter.

related to the Potato Root Eelworm. Several cases of failure of the oat crop were traced to this parasite in 1945, and it may be more widely spread than is at present imagined. Cereals other than oats are subject to attack, and the growth of this class of crop in annual succession, which has been the practice of many farmers during the war, tends to build up the eelworm population until the land becomes thoroughly oat sick, and it is necessary to rest it from cereals, especially oats, for five to six years.

In May on a Peeblesshire farm considerable damage to a crop of beans was done by the Grey Field Slug (*Agriolimax agrestis*) and the Banded Grey Slug (*Arion circumscriptus*). Later, in autumn and early winter, because of the persistence of mild open weather, slugs remained unusually active, and on one Lothians farm so defaced the skins of a crop of swede turnips grown for market as to render them unfit for shop sale.

As a rule the Vapourer Moth (*Orgyia antiqua*) is not a pest of much economic importance in Scotland, but occasionally small local outbreaks occur in or near moorlands, where patches of heather and blaeberry are frequently stripped bare by dense masses of the caterpillar. Such an outbreak was recorded in 1945 on a small upland estate in the Sidlaw Hills near Balbeggie, Perthshire. Half an acre of a young plantation of hybrid larch and Scots pine, together with the associated heath vegetation, was completely defoliated. So far as the Scots pine was concerned the position was further aggravated by a fairly intense infestation of the Pine Sawfly (*Diprion pini*).

In Scotland, apart from virus diseases, the two most important enemies of plantation raspberries are the Raspberry Moth (*Lampronia rubiella*) and the Raspberry Beetle (*Byturus tomentosus*), the former attacking and destroying the young shoots of the growing canes in spring, the latter the flowers and fruit in late spring and summer. For both pests there are effective means of control, which are, however, not regularly practised by commercial growers. A derris dust or spray applied when the blossoms are due to open is lethal to the beetles which feed first on the flowers, whilst the moth can be controlled by the application in February to March of a tar-distillate-oil wash to the soil around the stools of the raspberry canes just previous to the emergence of the caterpillars from their hibernating quarters in soil crevices on their way to the cane buds.

Although the Tomato Moth (*Polia oleracea*) is a fairly common pest of glasshouse tomatoes in England, particularly in the Lea Valley, it is not so common in Scotland, although I have records of its occurrence both in Strathclyde and the Lothians. Periodically, however, glasshouse growers in Eastern Scotland have experienced infestations of two kindred moths of similar habits, the Pearly Underwing (*Agrotis saucia*) and the Angle Shades (*Phlogophora meticulosa*), the former of which severely damages both tomatoes and chrysanthemums, and the latter, chrysanthemums, under glass. In early July 1945 a caterpillar infestation of tomatoes by a moth, which turned out to be the Pearly Underwing was

reported from a large commercial glasshouse near Edinburgh, and this species, together with the Angle Shades, did much damage to the flowers of glasshouse chrysanthemums in the Lothians and Border counties as late as December.

It is interesting to note that the Pearly Underwing is a well-known migrant, and its occasional abundance in Scotland is no doubt associated with the arrival of swarms of immigrants from the continent. Its migratory habit would explain its unexpected appearance in 1945, which was a year notable for migrant butterflies as well as moths. Among the former, the Peacock, Painted Lady, Red Admiral, and Small Tortoise-shell were prevalent in Eastern Scotland, and among moths the *Convolvulus* Hawk-moth, the Pearly Underwing, Angle Shades,¹ and Silver Y were all more or less common.

The depression of the greenfly populations of market-garden and potato crops of the Lothians in 1944 due to the unusual increase of their insect and fungus parasites, to which reference was made in last year's 'Transactions,' persisted during the growing season of 1945. There was, however, a slight upward trend of the two potato-infesting species, *Myzus persicae* and *Macrosiphum gei*, in August, but too late to affect the crop-yields materially.

During the summers of 1944 and 1945 a series of trials planned to test the efficacy of D.D.T. in the control of flies, chiefly the Stable and House Flies, in dairy barns was undertaken at selected farms in the East of Scotland College province under a scheme initiated by the Agricultural Research Council, and involving eleven other centres in Great Britain. The results showed that 0.1 per cent D.D.T. in an aqueous suspension of 2 per cent "Guesarol E," is lethal to flies up to three or four weeks after application as a spray to all interior surfaces. The control achieved, however, is limited by the continual re-invasion of treated barns by fresh stocks of flies bred in the manure of adjacent middens and cattle courts. At one farm, dairy premises which were infested by the House Fly were treated in the middle of August with good results. Here re-invasion was precluded by wire-mesh fly-screens fitted to the windows and doors, with the result that the dairy remained fly-free for the remainder of the season.

Blood-sucking midges and Scotland have come to be traditionally identified, and because of the attention that has lately been paid in the Press to the midge problem it was felt that it should not be neglected in the present report, the less so since it concerns not only summer holiday-makers and travellers in the Highlands, but also agricultural and other outdoor workers in most rural areas. In passing, it should be remarked that, in Britain, a reputation for bloodthirsty midges is not the monopoly of Scotland, but is likewise shared by the hill country of the north and west of England and of Wales. Although midges are more abundant in the Highlands than in the rest of Scotland, the problem also exists in less acute form in lowland rural and suburban districts.

¹ Williams, C. B., Cockbill, G. F., Gibbs, M. E., Downes, J. A. (1942). "Studies in the Migration of Lepidoptera." Trans. Roy. Ent. Soc., London, Vol. 92, Part 1, p. 141.

BITING MIDGES (*Culicoides*).

By inserting a brief account of biting midges in this year's review of Scottish Insect Pests, the author has no wish to convey the impression that they were more noxious in 1945 than in other years—for they are a pest of uniform perennial intensity—but rather does he desire to draw attention to the fact that our knowledge of their habits and life-histories is sadly deficient and requires considerable enlargement before there can be any hope of successfully achieving their control. At the same time there is no need to apologise for their inclusion in an article which is primarily devoted to the discussion of farm and forest pests, since biting midges are the bane of outdoor farm and other workers from late spring to early autumn, to say nothing of their annoyance to live stock as well as to man.

Definition of a Biting Midge.—To the popular mind the term "midge" suggests a fly of insignificant size that has the obnoxious habit of persistently pestering human beings during periods of close, clammy weather, particularly in the late afternoon and evening. Broadly speaking, midges are of two kinds, those like the above which bite their hosts and draw blood, and others—the majority—which are harmless and do not bite. The members of the two classes are characterised by their habit of congregating in oscillating swarms, which sometimes appear to fill the air. All such swarms of minute flies are excusably viewed by the layman with suspicion, but this suspicion requires to be supported by a close examination of individual specimens collected from swarms before the differentiation of biters and non-biters can be confirmed; unless, indeed, physical proof is forthcoming in an attack by the flies on one's person, which results in bites accompanied by intense skin irritation.

In brief, the identification of a biting midge rests upon the following rather minute characters (Figs. 1 and 2), which are only verifiable by the aid of a powerful magnifying lens or a microscope: (1) dark shadings usually present on the wings; (2) hairs on the wings of two kinds: the first, short, forming a uniform dense coat, the second longer, fewer, and more diffuse; (3) thickened front wing-margin (*costa*) stops well short of wing-tip; (4) hind wing-veins weaker than the first, which encloses two small spaces near its end; (5) pad absent between the terminal claws of the feet.

Kinds of Biting Midges.—According to Edwards, Oldroyd, and Smart,¹ there are some two and a half dozen species of British biting midges, of which about a dozen and a half have been recorded from Scotland. Recent preliminary investigation, however, has shown that the Scottish list will require to be supplemented, and has served to emphasise the need for an extension of our knowledge of the habits and life-histories of practically every Scottish species.

¹ Edwards, F. W., Oldroyd, H., and Smart, J. (1939). "British Blood-sucking Flies." London.

Distribution in Scotland.—Generally speaking, the range over which an insect is spread depends partly on climatic and partly on biotic conditions, but the two are not inseparable. Their variability as between one Scottish region and another, east and west, north and south, explains the lack of uniformity in the distribution of biting midges in a country even so small as Scotland. Their greater density in the Highlands and particularly in the west is doubtless associated with the prevailing high rainfall and the extensive areas of bog which offer suitable breeding conditions to midges of various kinds. While breeding sites are all important, they are not alike for all species, although there is general agreement in the

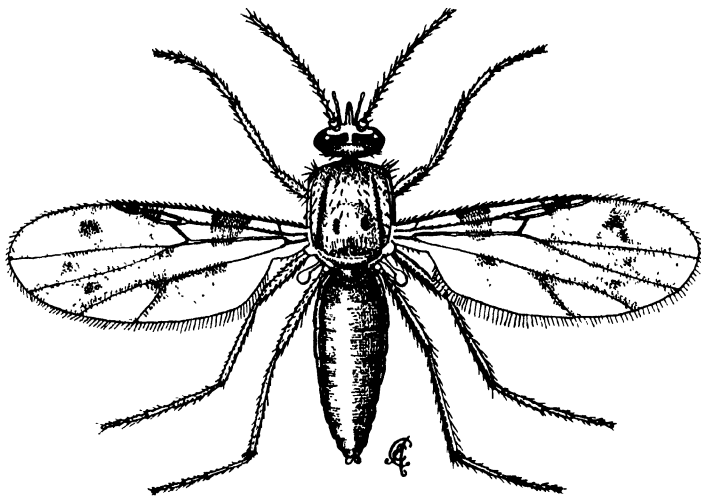


Fig. 1.—*Culicoides impunctatus*. Female $\times 22$.

From nature.

Common species of biting midge in the Scottish Highlands.

choice of environments that are either wholly aquatic or characterised by abundant moisture.

According to existing knowledge, the early stages of biting midges have been variously recovered from fresh-water pools, ponds, ditches usually overgrown with algæ and confervæ, in the brackish water of pools and creeks by the sea, in the water-logged soil of bogs, damp earth under trees and shrubs, damp decaying vegetation, rot-holes of trees, tree sap, liquids seeping from manure heaps, and animal excreta (sheep-dung).

In a single boggy moorland locality in Peeblesshire, by means of trap-boxes set out on the surface of the ground, as many as six species of biting midges, including *Culicoides pallidicornis*, *C. pulicaris*, *C. delta*, *C. impunctatus*, *C. obsoletus*, and *C. cunctans*, were recovered. The species are here arranged in the order of their abundance, and *pallidicornis* far outnumbered the others. It

is realised, however, that the results might have been different had it been possible to expose the boxes earlier in the season than July, when they were first set out and then left until early October. Apart from the number of species recovered, the interesting feature of the experiment was that, except for *C. pulicaris* and *C. obsoletus* nothing was previously known of their breeding habits, and even *C. pulicaris* and *C. obsoletus* had not before been recorded from marshy ground.

Important Scottish Species.—Although something like a dozen Scottish species of midge are known to attack man, there are only four or five that are troublesome—namely, *C. impunctatus* (Fig. 1), *C. obsoletus* (Fig. 2), *C. heliophilus*, *C. pulicaris*, and possibly *C.*

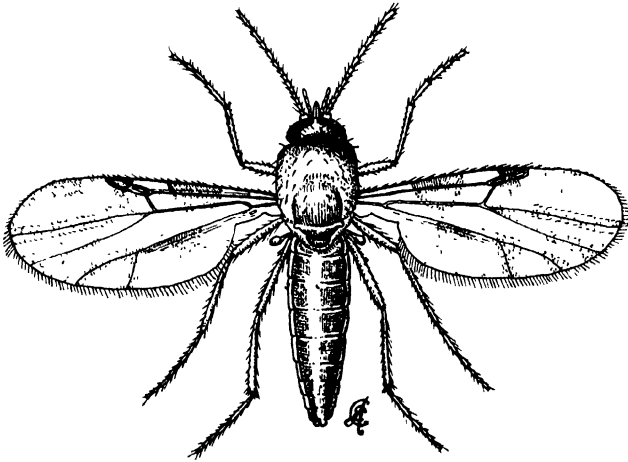


Fig. 2.—*Culicoides obsoletus*. Female. $\times 20$.

From nature.

Common species of biting midge in rural and suburban districts.

pallidicornis. So far as their relative importance is concerned, *C. impunctatus* is immeasurably the most outstanding, and is the one which has gained for Scotland its unenviable reputation of a midge-ridden country. In the summer there can be few who visit, or are otherwise identified with, the Scottish Highlands, who do not have unpleasant recollections of the myriad fierce plague of midges at many popular holiday resorts. But it must not be assumed that the midge problem is peculiar to Scotland, since it occurs with almost equal intensity in the hill districts of the north and west of England and in Wales, where again *C. impunctatus* is chiefly responsible.

In lowland Scottish districts the midge problem is less important than in the Highlands, but, locally, in rural and suburban areas, *C. obsoletus* and *C. heliophilus* are often abundant, and, in blood-thirstiness, yield little to *C. impunctatus*. Unlike the majority of

biting midges, *C. heliophilus* displays its greatest activity during the middle of the day, disappearing before evening when others are most in evidence. Under dull sultry conditions, however, both *C. impunctatus* and *C. obsoletus* may appear early in the afternoon.

Life-history.—The eggs of *Culicoides* are dark in colour, somewhat banana-shaped, and less than half a millimetre in length. After pairing, feeding, and digesting a blood meal, the female, according to the species, proceeds to lay her eggs singly or in small groups on the surface of pools and ponds that often bear a scum of green algæ, on the wet ground of bogs, damp soil under trees and shrubs, and in decaying vegetation. Incubation of the eggs occupies about six days, at the end of which there hatches a slender, worm-like larva (Fig. 3), which in the larger kinds grows to a length of about nine millimetres ($\frac{3}{4}$ inch). It is characterised by its elongate narrow form, with a small oval brownish head bearing a pair of kidney-shaped black eye-spots. The inconspicuous

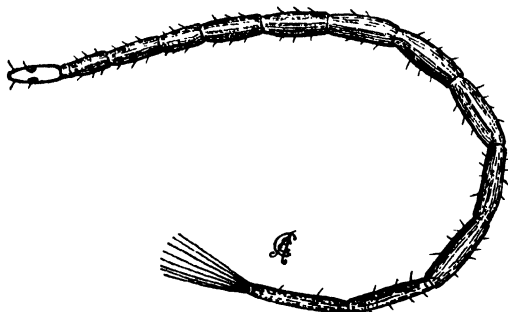


Fig. 3. Larva of a biting midge. $\times 20$.

From nature.

antennæ, which are placed well forward, are abbreviated and stump-like. The body consists of twelve segments, and ends in a tuft of about a dozen longish bristles. The body is delicately engraved by close-set longitudinal striations, and bears a few sparsely distributed hairs. There are no legs or other body appendages. In the absence of respiratory pores (spiracles) the larva acquires its supplies of oxygen from that dissolved in water by diffusion through the investing cuticle.

The larvæ swim freely in water in serpentine fashion, the flexions of the body producing a vibratile spirochæte-like movement. Those that occur in water spend much of the time quiescent in the bottom mud with only the front part of the body exposed. Little or nothing is known of the larvæ which dwell in wet boggy soil and decaying vegetation, neither of their food-habits nor of their longevity. It is suspected that for some the duration of larval life may be as much as six months or more, and that they hibernate as larvæ. It is possible that for many there is but one generation per year, but there is evidence that *C. obsoletus* may produce two.

The *pupæ*, which are about 2 mm. in length, are found either on the surface of water or, in terrestrial species, in damp soil. After three to seven days the pupal skin splits to release the adult midge.

Habits.—Midge bites are accompanied by an irritation which is usually out of all proportion to the size of the flies. Its intensity varies in some degree with the susceptibility of the individual person and also with the kind of midge. The latter wastes no time in inserting its sharp mouth lancets, and the skin around the puncture becomes red and swollen. In some individuals the effects are transitory and of short duration, while in others the discomfort may last for two or three days. Scratching so far from relieving the irritation only serves to intensify it, and there is the added risk that the resulting skin abrasions may become secondarily infected with bacteria. According to Jobling, quoted by Edwards (*loc. cit.*), midge punctures which are first moistened and then rubbed with a crystal of sodium carbonate are relieved of irritation, and the swelling quickly subsides.

It is frequently remarked that biting midges are most troublesome to human beings who have become heated by exertion. The insects are attracted by the warmth radiated from the skin. Their attacks are mainly concentrated on exposed parts of the body, including the hands, wrists, face, neck, and scalp, but they can also work through the fabric of garments to reach the skin beneath.

Control.—It has been argued that because tropical mosquitoes in battle zones have been successfully controlled by the application of insecticides to their breeding places in the water of pools and swamps, it should be possible to abate the midge nuisance by the same or similar methods. Such an argument, however, fails to appreciate fundamental differences in the breeding habits of mosquitoes and midges and in the modes of respiration of their respective larvæ. In the first place, mosquitoes breed nowhere except in the standing water of pools, in ditches, swamps, and margins of streams; while biting midges, as already remarked, breed abundantly in damp soil and decaying vegetation as well as in pools and ponds. Again, in order to breathe, larval mosquitoes must periodically visit the surface of the waters they infest; while midge larvæ, by making use of dissolved oxygen, are independent of the surface. Thus, mineral-oil films or coatings of finely divided insecticidal dusts—derris, pyrethrum, Paris green, D.D.T., which, spread on the surface of infested waters, are lethal to mosquito larvæ, would leave those of biting midges virtually unaffected, although not so their pupæ, which are surface residents. Therefore, for the successful control of midges which breed in open water, emulsified insecticides mixing with water in all proportions would require to be used, involving destruction to all and sundry living organisms that inhabit water. Even if this method of control were practicable, the problem would still be unsolved, since there would remain those midges, probably the greater number, which breed elsewhere than in open waters and are not so readily reached by insecticides. In any case, the habits of the non-aquatic midges require extensive

investigation before any methods of control could be suggested, to say nothing of the cost of treating large areas of land of a comparatively low productive level.

In the absence of satisfactory eradivative measures, recourse must be had to the use of repellents to protect human beings from midge attack. Experimental trials with this class of substances against mosquitoes in the recent world war brought to light one of considerable promise in dimethyl phthalate (D.M.P.). This substance incorporated in skin creams or emulsions, applied to exposed surfaces of the body, gives relief from midge attack for two or three hours, which can be extended by renewal of the treatment.

According to an announcement published in the ' Scotsman ' of 2nd April 1946, extensive tests of midge-repellent D.M.P. pastes, lotions, and emulsions were made by a team of biologists on human volunteers in midge-infested districts of Scotland in 1945.* The work was carried out under the auspices of the Scientific Advisory Committee of the Department of Health for Scotland. An emulsion which gave satisfactory results was prepared according to the following formula :—

Lanette Wax S.X.	. . . . .	5 grammes
Triethanolamine	. . . . .	9 cc.
Oleic acid	. . . . .	27 cc.
Dimethyl phthalate	. . . . .	100 cc.
Water	. . . . .	100 cc.

Where the emulsion is applied to the face, precautions should be taken to prevent its getting into the eyes, and it should not come into contact with the tortoise-shell or plastic frames of spectacles.

CATERPILLARS OF GLASSHOUSE CROPS.

The caterpillar pests of glasshouse crops are chiefly cutworms (Noctuidæ) and leaf-rollers (Tortricidæ). Among the former there are included the Tomato Moth, *Polia oleracea* (Fig. 4), or Bright-line Brown-eye, which is probably the one best known to glasshouse nurserymen; the Pearly Underwing, *Agrotis saucia* (Fig. 5); the Angle Shades, *Phlogophora meticulosa* (Fig. 6); and the Cabbage Moth, *Mamestra brassicae*. All four kinds normally occur outdoors on cruciferous crops except the Angle Shades, whilst all may breed on a variety of common weeds such as dock, groundsel, chickweed, plantain, goosefoot, nettle, knotgrass, and bracken, according to individual preferences. On outside crops the Cabbage Moth is the one most frequently encountered, where it is destructive not only to cabbages but to turnips, lettuce, rape, peas, and onions. Indoors, the Angle Shades confines its destructive activities mainly to chrysanthemums during autumn and early winter, whilst the others attack both tomatoes and chrysanthemums.

None of the species mentioned have apparently become domesticated to the extent that they breed continuously under glass. On

the contrary, their introduction into glasshouses would seem to be annually repeated with the transference indoors of transplants, already infested with eggs, from outside nursery beds. There is also the other possibility that the moths may voluntarily enter glasshouses through open ventilators or holes in broken panes.

In July 1945 a report of extensive caterpillar damage to tomatoes was made by a large commercial grower in South-east Scotland. Examination showed that ripening fruits were extensively gouged, often with the insects half embedded in the excavations they had made. It was observed that the caterpillars did most of their feeding by night, and during the day they remained hidden in the trusses or amongst the foliage. By 12th July numerous full-grown caterpillars were found buried one to two inches deep in the moss-litter mulch of the tomato beds, into which they had burrowed preparatory to their transformation to pupæ. From the latter,



Fig. 4.—*Polia oleracea*. *Tomato Moth. Female.* $\times 1\frac{1}{2}$.

From nature.

moths of the Pearly Underwing were reared in late August and early September, and from these a further generation of caterpillars of smaller proportions than the previous one was found with the Angle Shades attacking glasshouse chrysanthemums (Fig. 7) in October and November.

Infestations of the Pearly Underwing in glasshouses are of interest, as, unlike those of the Tomato Moth, they are apparently of rather rare occurrence. The suggestion has been made that its periodic abundance may be due to the invasion of Britain by immigrant individuals from abroad, either in small numbers in spring or as swarms later in the year.

In glasshouses the Tomato Moth and the Pearly Underwing have the same feeding habits and times of appearance, but the two are not to be confused. The moth of the Pearly Underwing is the larger, having a wing-spread of about 2 inches, at least $\frac{1}{4}$ inch more than that of the Tomato Moth. The fore-wings of both are

reddish brown, those of the latter a richer shade relieved by a contrasting marginal white wavy line; the fore-wings of the Pearly Underwing, on the other hand, have no marked relief, and are merely splashed with irregular dusky markings. The name of the latter emphasises the pearly white hind-wings, in which the brown veins stand out clearly; those of the Tomato Moth are greyish white.

The caterpillars of both moths vary in colour from green to brown and are marked with segmentally arranged black dashes. The full-grown caterpillar of the Pearly Underwing is about 2 inches long and slightly larger than that of the Tomato Moth. On the second last segment of the former there is a conspicuous dark



Fig. 5. *Agrotis saucia*. *Pearly Underwing*. *Female*. $\times 2$.

From nature.

W-shaped mark and a black V- or H-shaped mark on the front of the brown head. These marks are absent in Tomato Moth caterpillars. As regards the spiracles or respiratory pores ranged in series along each side of the body, those of the Pearly Underwing are entirely black; those of the Tomato Moth white, ringed with black.

Infestation of glasshouse chrysanthemums by caterpillars of the Angle Shades in the autumn and early winter was just as general and intensive as the earlier infestation of tomatoes by the Pearly Underwing in June and July. In the opinion of some growers this was the first attack of the Angle Shades which they had experienced, and all were agreed upon its severity. In one glasshouse of moderate size the owner reported that at the height of the infestation in November it was not unusual to collect more than one hundred

caterpillars on the plants in a short time each day. Both blossom-buds and open flowers are attacked; in the former the caterpillars nibble the margin, creating a blemish which inhibits further growth at the point of injury. The result is an unshapely flower with its appearance so marred as to render it worthless.

In open blossoms the caterpillars work their way from the margin to the centre of the disk, trimming the petals evenly as they go. The damage is identical with that committed by Cabbage Moth caterpillars on dahlia and calendula flowers in gardens, to which reference was made in the 'Transactions' of 1939 (p. 172). Like the Angle Shades, the Cabbage Moth may also be a visitant in glasshouses and subsist on chrysanthemums. Caterpillars of Angle Shades and Cabbage Moth are difficult to distinguish. Both



Fig. 6. —*Phlogophora meticulosa*. *Angle Shades Moth. Female.* $\times 1\frac{2}{3}$.

From nature.

exhibit the same range of colour variation from green to brown through intermediate shades, and closely resemble each other in surface markings above and at the sides, the underside being pale and the spiracles black-rimmed.

When newly emerged from their pupæ in the soil the Angle Shades is a strikingly handsome moth, with fore-wings in which there blend shades of olive green, rose pink, and fawn; hind-wings are yellowish white, crossed by one or two narrow dark lines, and shaded brown at the margin. The outer edges of both wings are scalloped, and the fore-wings, wrinkled along their length in the resting position, are so folded to the body that the insect resembles a crumpled leaf. Among noctuid moths the Angle Shades is comparatively large, with a wing-spread of 2 inches and the body $\frac{3}{4}$ inch long.

Control. — Since the caterpillar inhabitants of glasshouses ordinarily breed out of doors on coarse weeds, the first step in their control should therefore be the destruction of all such weeds in the vicinity of glasshouses. Chrysanthemums that are perchance infested in nursery beds outside should be sprayed with lead arsenate or other suitable insecticides before they are brought inside. One spray recommended consists of lead arsenate 6 lb., saponin 2 oz., water 100 gall. This spray may also be used for



Fig. 7.—*Agrotis saucia*. *Caterpillar of Pearly Underwing*. $\times \frac{1}{4}$.

From nature.

The chrysanthemum flower has been partly devoured by the caterpillar.

protecting tomatoes, and three treatments should be applied: the first just after the plants are potted, the second after they are planted out, and the third one month before the picking of the fruit is begun.

Trapping the moths is perhaps more effective than spraying. For this purpose a bait mixture consisting of ale 2 fluid oz., treacle 1 fluid oz., and sodium fluoride $\frac{1}{30}$ oz. is exposed in open jars suspended from the roof of the glasshouse by wires. The bait is periodically renewed. All damaged fruit which might divert the moths from the bait jars should be removed.

THE RASPBERRY MOTH (*Lampronia rubiella*).

The importance of the Raspberry Moth (Fig. 8A) is second only to that of the Raspberry Beetle (*Byturus tomentosus*), although in the past few years the depredations of both have been rather overshadowed by the spread of Raspberry Mosaic, a virus disease which has been responsible for a marked reduction in the vigour and productivity of raspberry stocks in Scottish plantations in Angus and Perth. Investigation of the virus problem is under way, and it is hoped that a solution will be found either by control of the natural agent or agents of transmission, as yet unknown, or by the creation of resistant or non-susceptible varieties of raspberries.

With regard to the moth and beetle pests, the situation is different, since for both satisfactory methods of control are available, although they are frequently neglected by growers. With the discovery (1930-33) that the Raspberry Beetle could be successfully controlled by derris sprays or dusts applied to infested plantations in June, this particular pest has ceased to be a menace to growers. An equally effective mode of control for the Raspberry Moth, which was first tried in Holland and later in Sweden, is likewise available to growers, but has received little attention in this country. It will be noted later when control measures are discussed.

Host Relations.—The host relations of the Raspberry Moth are interesting, since in the course of its life-cycle, in which there is but a single generation per year, the caterpillar attacks the raspberry plant on two several occasions, which are separated by a period of about nine months' inactivity. The first attack is concerned with the receptacle or plug of the growing fruit. In early June the moth lays its eggs in the flowers; from these the caterpillar hatches in about a week and proceeds to burrow into the plug, where it remains feeding until the fruit begins to ripen in July, when it departs and passes into the soil. The damage done by the caterpillar at this stage is inappreciable, and does not interfere with the normal development of the fruit.

In the soil the caterpillar remains active only so long as is necessary for it to discover a suitable shelter for hibernation. Such are to be found behind loose pieces of rind at the bases of the canes, in cracks of supporting stakes, beneath surface rubbish around the stools, and even in crevices of the soil itself. In the chosen sites a cocoon is spun by the caterpillar, and therein it lies dormant until spring of the following year. With the resumption of its activity in April the caterpillar abandons its cocoon, creeps up the canes to the buds, which are the subject of the second caterpillar attack, and boring into the bud-base takes up its position inside. There it feeds on the contents, and may continue to tunnel into the pith, with the result that development of the buds is partly or wholly inhibited. Some of the affected buds contrive to produce shoots of varying size, but ultimately they all wilt and perish.

Description.—In the buds and shoots the caterpillar (Fig. 8B) spends four to six weeks, during which it attains a length of $\frac{1}{4}$ inch and its colour changes from white to pink and then red. The head and legs are black, and there is a dark plate on the upper side of the first and last body segments. Over the body there is a sparse sprinkling of minute hairs.

The mature larva makes a small cavity for itself in the pith or in the shoot where the latter joins the stem, and there it changes

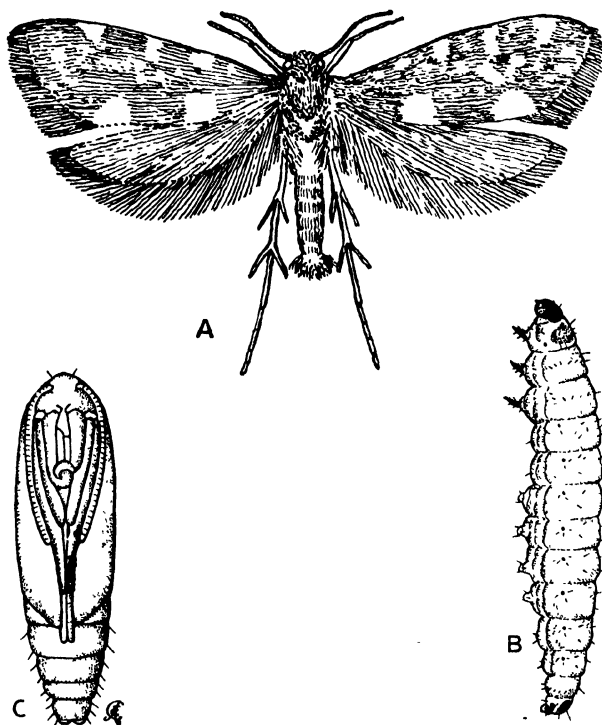


Fig. 8.—*Lampronia rubiella*, Raspberry Moth. A. Female. $\times 8$;
B. Caterpillar. $\times 9$; C. Chrysalis. $\times 9$.

From nature.

to a chrysalis (Fig. 8C), which assumes a reddish-yellow colour and tapers to a point behind. The life of the chrysalis is three to four weeks, after which the moths emerge, usually at the end of May and beginning of June.

The Raspberry Moth (Fig. 8A) is no larger than a Clothes Moth, less than $\frac{1}{4}$ inch across the outspread wings. Its general colour scheme is brown, the fore-wings purplish, speckled with conspicuous yellow spots, of which two at the hind border are larger than the rest. The hind-wings, which are paler brown, are unspeckled.

The moths are found at the end of May and June flying among the canes and plantations and sitting on the flowers, on which they lay their eggs.

Alternative Hosts.—The Raspberry Moth is partial to bramble and loganberry, as well as to the cultivated raspberry. Wild raspberry, which grows in waste places and along roadsides, is often heavily infested, and must serve as a reservoir from which infestation spreads to nearby plantations.

Control.—In virtue of what is known about the hibernating habits of the immature caterpillars, steps should be taken after an attack to collect whatever rubbish may be lying around the stools, and this with old canes and broken supporting stakes should be removed and burned.

The method that has been adopted by Dutch and Swedish growers is that of spraying the canes with an 8 per cent tar-oil wash. It is recommended that the treatment should be applied not later than the last week of February. Under Scottish conditions it may be postponed to as late as the second week of March in most seasons, but this is a matter in which the grower must exercise his judgment. On no account must spraying be undertaken after the buds begin to show signs of "movement."

On one Scottish plantation where the infestation was such as to average fifteen caterpillars per cane at the rate of one per bud, a tar-oil wash was applied to the stools and bases of the canes in the second week of March. Four weeks later the treated rows of canes were clothed with healthy green shoots, whilst on the untreated rows there was such a marked deficiency of shoots that they presented a bare, unthrifty appearance.

Among commercial varieties, Lloyd George appears to be more highly resistant to moth attack than others, and it also appears to recover more quickly from attack by sending out adventitious buds. It should be noted that a certain measure of recovery occurs in all varieties, but the yield of fruit is reduced by the set-back which infested canes suffer. Adventitious buds do not succeed in making good the loss suffered by the first crop of buds.

THE VAPOURER MOTH (*Orgyia antiqua*).

In the 'Transactions' of 1937 reference was made to sporadic infestations of the Vapourer Moth on Scottish moorlands, where patches of heather usually no larger than a few square yards are sometimes laid bare by its caterpillars. The small extent of the damage, combined with the slow spread of the pest and the low economic value of its moorland food-plants, usually renders the practice of special control measures a matter of little necessity. Occasionally, however, outbreaks of the Vapourer Moth assume a more serious aspect, where young forest plantations become involved, and the trees are defoliated. Such was the experience of an estate owner on the Sidlaw Hills, Perthshire, in the summer of 1945. According to his account of the trend of events, the pest

was observed at work on a small scale the previous year on a piece of hill ground some 950 feet above sea-level. Thence it spread downhill in 1945, until in August something more than an acre of 6-year-old larch and 4½-year-old Scots pine was heavily infested and damaged. Not only was the larch defoliated, but the underlying cover of heather and blaeberry was also stripped bare. Curiously, cranberry and black crowberry, common components of the flora, were left unscathed by the caterpillars. Damage to Scots pine was less severe than that to larch, since the attack was confined to last year's needles only. From this it might be inferred that pine is less attractive as a host than is larch, and



Fig. 9.—*Orgyia antiqua*. Eggs of *Vapourer Moth* on cocoon wall. $\times 1\frac{1}{2}$.

From nature.

therefore less susceptible to injury than is the latter. On the Sidlaws, however, it so happened that the Scots pine was simultaneously infested by caterpillars of the Pine Sawfly (*Diprion pini*), and this served to aggravate the damage done by the Vapourer Moth. As an index of the intensity of the infestation, it may be stated that as many as 500 caterpillars were counted on a single larch 4½ feet high, and about 250 on one not more than 3 feet; on the ground they amounted to about 200 per square foot.

There can be little doubt that the localised nature of Vapourer Moth infestations on moorlands and in plantations is correlated with the sedentary habits of the wingless females, which remain by, and lay their eggs (Fig. 9) on, the cocoons from which they emerged. Their powers of locomotion are so limited in the absence of functional wings that they are quite ineffective as an agent of spread over large areas. Spread, therefore, is confined to a gradual enlargement of small infested areas contrived by the advance of

the caterpillars at the circumference into adjacent fresh ground, and this advance stops in any one year with the transformation of the caterpillars to the resting chrysalis. Resumption of this local spread may occur the following year when the caterpillars of the next generation, of which there is but one per year, hatch from the eggs that survive the winter. Experience, however, shows that infestations are frequently reduced almost as quickly as they arise, since the eggs and caterpillars of the Vapourer Moth are susceptible to the attacks of numerous insect parasites and predators. The hairy-tufted caterpillars have apparently little attraction for insectivorous birds; starlings, rooks, and gulls, which commonly quarter districts infested by another common caterpillar of the hills—namely, that of the Antler Moth—were not in evidence on the Sidlaws in July to September during the period of activity of the Vapourer Moth caterpillars.

There is a choice of methods for coping with the Vapourer Moth should the necessity arise. In small infestations the empty cocoons present in low-lying vegetation, together with the adherent egg masses, can be collected and destroyed by burning. A lighted torch will serve the same purpose in dealing with the egg-coated cocoons attached to the branches and twigs of trees. Alternatively, the eggs could be readily dealt with by the application of a winter tar-oil wash. Should ovicidal methods be neglected, the caterpillars may be brought under control by treating infested host-plants with an arsenical or D.D.T. spray.

ROOT EELWORM OF OATS (*Heterodera major*).

Distribution.—The Root Eelworm has long been known as a serious pest of oats in northern continental countries, where it also attacks, although in lesser degree, barley, wheat, and rye. In Britain it has been found chiefly in the Midlands, infesting the roots of oats, barley, and wheat, but it does not appear to be widespread. Regarding its existence in Scotland previous to the war little is known, and it is only during the past two years that our attention has been drawn to its occurrence in the Lothians near Edinburgh. As to whether it exists elsewhere in Scotland remains to be discovered.

Relations of the Root Eelworm of Oats.—According to Goodey,¹ the Root Eelworm of sugar beet was first found on the continent in 1857, and named *H. schachtii* by Schmidt in 1871. Eelworms of similar appearance and habits were later found attacking a number of different crops, including cereals, potatoes, peas and beans, and the imperfect state of our knowledge of the various forms seemed to make the acceptance of their rank as biological races of *H. schachtii* the most satisfactory for the time being. With the acquisition of further knowledge the position has materially changed, so that Miss Franklin,² who has lately reviewed the situation, now

¹ Goodey, T. (1933). "Plant Parasitic Nematodes," London. p. 127.

² Franklin, M. (1944). "On the Specific Status of the so-called Biological Strains of *Heterodera schachtii* (Schmidt)." Jour. Helm., Vol. XVIII., pp. 193-308.

recognises four distinct species instead of the original one, including (1) *H. schachtii* of the sugar beet and cabbage families; (2) *H. major* of cereals, chiefly oats; (3) *H. göttingiana* of peas, beans, and vetches; (4) *H. rostochiensis* of potatoes and tomatoes.

Symptoms of Damage.—Oats infested by the Root Eelworm first begin to show signs of stress in May, continuing into and becoming more acute in June. Individual plants remain stunted, and where infestation is general the whole crop becomes smothered with weeds. Soon after the attack begins the leaves lose their normal green colour, wilt, and change to a pallid yellow. This transformation is caused by the eelworms burrowing into the roots and thereby checking the free circulation of mineral food to the leaves and the translocation of starches to the roots.

By the middle of June deterioration may affect the whole field or occur only in patches according to the intensity of the infestation, which makes more headway in light than in heavy soils.

Examination of the roots of affected plants in June serves to confirm the diagnosis made on the basis of leaf symptoms. In a healthy plant normal roots are long and only slightly branched, whereas eelworm disease induces the production of short thick many-branched roots which arise near the surface; they are commonly referred to as starvation or hunger rootlets, to which the soil firmly clings. This production represents the plant's attempt to make good the destruction which has overtaken the first formed roots.

Life-history.—The Root Eelworm of oats has only one generation per year. In this respect it resembles the Root Eelworm of the potato (*H. rostochiensis*). The resistant cyst, which contains up to 600 eggs, hibernates in the soil for nine months. Hatching of the eggs under suitable conditions of temperature and moisture may begin in April and continues through May and June, when it apparently declines. The young larvæ, which are but half a millimetre in length, escape from the cyst into the soil, and thence burrow into a convenient rootlet of a young oat or other cereal plant. In the absence of a suitable food-plant the larvæ are said to be capable of living in a starved condition for six months.

The time required for the growth and development of the larvæ in the roots of the oat is by analogy with *H. rostochiensis* of the potato a matter of about thirty days, during which, like the latter, it probably undergoes two moults. At the termination of this period the sexes are differentiated: the male escapes into the soil, whilst the female, swollen and white (Fig. 10), is found partly projecting from the root surface, but still adherent. After pairing, the males die off, whilst the females, now a dark-brown colour, may remain attached until harvest, when they drop into the soil.

It should be noted that the annual round of development of the Oat Root Eelworm is adapted to that of its food-plant. The larvæ hatch from the brown cysts in the spring when the rootlets are young, tender, and readily penetrable. As the season advances hatching declines, and this falling off is correlated with the growth of stronger, tougher, and more resistant roots.

Crop Loss.—Losses attributable to an infestation of Root Eelworm can only be roughly assessed in terms of yield, even in the case of a single field sown to oats in successive years. With all due consideration to the absence of a properly constituted control, the information which was gleaned from just such a field on a Lothians farm has considerable interest. Beginning in 1943 this field of 22 acres had been sown to oats of the "Onward" variety for three successive years. During the first two years there was nothing in the appearance of the crop to indicate to the farmer the presence of an eelworm infestation, and the yield likewise proved satisfactory at about 96 bushels per acre.



Fig. 10.- *Heterodera major*. Cysts of Oat Root Eelworm. $\times 2\frac{1}{2}$.

From nature.

The cysts (ringed) are adherent to the roots which are abnormally branched.

In 1945 an early examination of the backward crop revealed a heavy infestation, which brought the yield per acre down to less than 12 bushels. From the evidence there can be no doubt but that the field was already infested when the first oat crop was sown in 1943, but it was not until two years had elapsed that the eelworm population reached a density large enough to effect the steep decline of yield in 1945.

Control.—There are two methods which can be employed for the control of Root Eelworm of farm crops. The first of these is the direct one which consists in the application of lethal chemical substances to cyst-infested soil, and the second is the indirect method of rotation, whereby a susceptible crop is omitted until such a time as the soil is reasonably free of infestation.

With regard to the first, experiments have been made by various authors, some quoted by Goodey (*loc. cit.*, p. 139), who have tested the killing effect on the cysts of carbon bisulphide, calcium cyanide, bleaching powder, and the chloracetates of calcium and ammonium. In recent years there have been added to the list iron sulphates and oxides,¹ and phenyl isothiocyanate.² The results have been variable, and the fact that chemical control has not been generally adopted would indicate that it has not yet met expectations. Further, the cost of the treatments, owing to the large amounts of the materials required, is such as to make them impracticable in operations of a field scale. What is urgently required is a cheap chemical, which will both induce the larvæ to hatch from the dormant cysts and destroy them promptly on emergence.

In rotational control the cysts are not immediately destroyed. As is well known, with their contained infective larvæ, they remain viable in the soil for five to six years, and perhaps longer. In the absence of a susceptible crop a certain percentage of the larvæ contrive to hatch each year, and may remain alive for six months before they die of starvation. Whereas it was previously supposed that the Root Eelworm of one crop, such as sugar beet, might infest another, such as cereals, potatoes, or peas, recent research has shown that each kind is restricted to a particular crop or group of related crops. Advantage of this fact is taken in the exercise of control by rotation, and it is now recognised as safe to follow a cereal crop infested with the Oat Root Eelworm by a root or other non-cereal crop. Above all, continuous cropping with cereals on infested ground should be avoided, and oats should be introduced into the rotation only between non-susceptible crops. No single variety of oats would appear to be less susceptible than another, but there is evidence that although barley is prone to attack by *H. major*, there are certain varieties which are more resistant than others. The use of such resistant varieties would offer a partial solution of the eelworm problem by stemming the increase of the parasite and materially reducing its population before oats are grown again in an infested field. In this regard the whole question of eelworm-resistant varieties, including the factors of resistance, requires intensive investigation.

¹ Hurst, R. H., and Franklin, M. T. (1938). "Field Experiments in Bedfordshire on the Chemical Treatment of Soil infested with the Potato Eelworm (*Heterodera schachtii*) during 1936-37." *Jour. Helm.*, Vol. XVI., No. 1, pp. 49-52.

² Smedley, E. M. (1939). "Experiments in the use of Isothiocyanates in the control of the Potato Strain of *Heterodera schachtii* (Schmidt)." *Jour. Helm.*, Vol. XVII., pp. 31-28.

AGRICULTURAL RESEARCH IN SCOTLAND IN 1945.

BEING A BRIEF SUMMARY OF THE WORK AT THE
SCOTTISH AGRICULTURAL RESEARCH STATIONS
AND AGRICULTURAL AND VETERINARY COLLEGES
DURING THE YEAR.

*Readers desiring fuller information on any of the subjects mentioned
should write to the Director of the Station or Principal of the
College at which the investigation is being carried out.*

INSTITUTE OF ANIMAL GENETICS.

UNIVERSITY OF EDINBURGH, WEST MAINS ROAD.

Cattle.—Owing to labour and other difficulties it was not possible to conduct any experimental work concerning the dairy cows at Shothhead. Plans are well forward for the reorganisation of the plant, and it is hoped by midsummer to be able to maintain, as formerly, full records both at Shothhead and Cockburn. About 120 dairy cows are now available for this work.

The results of an inquiry conducted before the war into the accuracy of the Scottish system of Milk Recording are being examined. About 250 lactations are compared. The Scottish Milk Records Association figures are inclined to exaggerate the true yields of both milk and butter fat. In about 40 per cent of the cases the error exceeds 10 per cent. The errors were more marked in high-yielding cows. It is clear that greater accuracy would be achieved if the fat samples were analysed under standard conditions at some central laboratories.

Pigs.—Observations were continued on mothering qualities as manifested in crossbred, pure-bred, and inbred pigs. Incidental data on colour inheritance suggests that the Large White may be genetically a black-spotted pig which has been "whitewashed" by a process of selecting against manifestation of spots (as was done to a lesser extent in the Gloucester Old Spot breed).

Live Stock Population Problems.—In this field various studies have been made with both pig and cattle breeds. Of 1000 pedigree Large White sows about 90 per cent were found to trace back within a few generations to four particular sires. In general, only a few animals of to-day will become ancestors of future generations, and

pedigree breeding, as now practised, appears to offer a somewhat unsystematic and chancy method of determining the most suitable animals for the purpose. Other studies related to the duration of effort by individual breeders, size of herd, geographical distribution, and the nature of breed expansion.

Poultry.—In addition to the maintenance of a number of breeding lines of Brown Leghorns selected for specific qualities, crosses between three such lines were bred last year. The results have a direct bearing on breeding principles in that mortality was abnormally low and egg production very high, an average of 225 eggs per bird being obtained.

Information concerning variables affecting infertility and embryonic mortality in the fowl have been obtained from a study of five years' records of a small group of hens. During two years they were mated to the same male and all the eggs incubated. Infertility and dead-in-shell rates showed considerable constancy for individual hens.

ANIMAL DISEASES RESEARCH ASSOCIATION.

MOREDUN INSTITUTE, GILMERTON, MIDLOTHIAN.

The investigations upon which the Association has been engaged in recent years are being continued. These include grass sickness in horses, lactation tetany in cows, white scour and allied diseases in calves, scrapie, enzootic abortion in ewes, tick pyæmia and pining in sheep and young cattle.

The systematic investigation of parturient redwater in cows is being continued, and the co-operative programme of research upon the important problem of mastitis in dairy cows is being actively pursued.

THE ROWETT RESEARCH INSTITUTE.

BUCKSBURN, ABERDEENSHIRE.

The main lines of investigation which have been in progress during the year 1945 are as under :—

1. *Influence of feeding of the mother on the viability and rate of growth of the offspring.*

Reference was made to this work in the previous report, and the investigation has been extended in the present year. It has been shown that the continuous use of diets, unbalanced with respect to calcium and vitamin B₁ content may cause lesions both in male and female rats, which could not be cured by subsequent dosing with pyridoxine. Some of the does were incapable of producing viable young. In less

severely affected females restoration of the vitamin balance enabled them to rear normal litters. The effects observed appear to be due more to the vitamin unbalance than to the excess of calcium.

2. *Iodine.*

The investigation carried out under the auspices of the Goitre Committee of the Medical Research Council has been continued, and a large mass of material collected from various parts of Great Britain have been examined and reported upon.

In conjunction with the Veterinary Investigation Officer of the North of Scotland College of Agriculture an occurrence of congenital goitre in calves was investigated. The effect of high and low doses of phenothiazine on the thyroids of young lambs has been observed.

3. *Availability of phytic acid phosphorus in cereals.*

This study has been continued, and it has been shown that a large proportion (85 per cent or more) of the phytic acid phosphorus from oatmeal can be liberated in the alimentary tract of the pig and that high doses of this form of phosphorus has no detrimental effect on either the calcium or phosphorus balances. There was some evidence that the phytic acid phosphorus utilisation may vary for different cereals. This work is being extended to a similar study with sheep as typical ruminants.

4. *Experimental Farm.*

The arrangement for the temporary amalgamation of the Duthie Experimental Stock Farm and Craibstone Farm has been continued throughout the year and is recommended to be made permanent. The joint farm has been organised for maximum food production, and the experimental work, chiefly on pasture improvement and cause of loss in storage of potatoes, was carried out in conjunction with the staff of the North of Scotland College of Agriculture.

The joint farm has also been used for demonstrations to farmers on the latest farming methods and maximum production of foodstuffs with minimum of man-power.

SCOTTISH PLANT-BREEDING STATION.

CRAIGS HOUSE, CORSTORPHINE, EDINBURGH.

Experiments on the breeding of cereals, potatoes, herbage plants, swedes, and other Brassicas are in progress at the Station. In view of the long-term character of most of the research it is

customary each year to describe briefly in the 'Transactions' one section of the work, and on this occasion that concerned with cereals and certain other crop plants will be reviewed.

During the war years the investigations had to be considerably curtailed; the experiments with barley and wheat were temporarily discontinued, but the hybridisation and selection of oats was continued on as large a scale as possible. It was not practicable to continue the regional trials of new oat selections, and the more promising hybrid progenies were, therefore, maintained in limited quantities at the Plant-Breeding Station for further multiplication when it was opportune again to have more extensive field trials. In 1945 a few regional trials on a comparatively small scale were arranged, and several of the new selections were included in observation trials in Shetland, Aberdeenshire, Yorkshire, and Somerset. In these trials certain varieties showed considerable promise and they are being tried on a more extensive scale in 1946. Two of these new varieties are short-strawed types, resistant to lodging, early ripening, and have well-filled white grain.

Further progress has been made towards breeding a type of oat which is suitable for general cultivation and which has grain that will not readily germinate during wet weather at harvest time. A few selections may soon be ready for multiplication and for subsequent field trials within the next few years.

Experimental work is also in progress with the object of breeding an improved type of oat which is tolerant of alkaline soil conditions. A small preliminary experiment with a few hybrid selections was carried out on alkaline soil in an area in the West Highlands last year and seeds were selected from the trial plot.

A representative collection of named varieties of oats, wheat, and barley has been grown each year for observation, reference, and demonstration.

Elite stocks of the Society's Early Miller and Bell oats have been grown each year, and there has been a good demand for seed of these two varieties.

The line or variety of barley selected from Scots Common barley (referred to in the previous cereal report in the 'Transactions') has been giving very satisfactory results in the north of Scotland, particularly in the Morayshire district, and it has been named *Craigs Triumph*. The grain appears to be a type suitable for distillers, and it may be of interest to mention here that it was reported in the press that grain of this variety was awarded first and second prizes in the class for barley at the Royal Northern Spring Show, Aberdeen, in 1946.

In the course of the experiments with beans it has been found that an appreciable amount of natural intercrossing has been occurring amongst these plants. In order to prevent this intercrossing, individual plants of the experimental stocks are now protected from cross-pollination by enclosing them, when in flower, in suitable fabric bags. The enclosed plants set seed moderately well, and when reasonably pure-breeding selected strains are secured, they will be multiplied in spatial isolation and afterwards

included in field trials. The main object of the work with beans is to breed earlier-ripening, higher-yielding varieties.

The possibilities of introducing new crop plants for cultivation in this country have also been kept in view. For a few years small quantities of two unnamed wheat-rye hybrids raised in the United States of America have been grown for observation. These hybrids are quite winter-hardy under conditions at Corstorphine, but the yield and quality of the grain compare unfavourably with the ordinary winter wheats commonly grown here. The straw of one of the varieties is very weak and lodges readily.

Seeds, recently obtained from abroad, of certain crosses between cultivated wheat and certain species of wheat grass (*Agropyron*) have been sown for observation of the characters of the resulting plants.

Several varieties of Soya bean were under observation a few years ago, but none so far tried has shown promise of being suitable for cultivation in Scotland. The varieties of German origin produced the largest plants, but they formed no seeds. It is hoped to have further trials of this plant on account of the high protein content of its seeds.

Shortly after the beginning of the recent world war it was suggested, in view of the scarcity of vegetable seeds, that efforts should be made to seed certain vegetable plants at the Plant-Breeding Station. Peas, onions, leeks, and carrots were among the vegetables specially grown for this purpose. Peas produced a moderate yield of seed, but the seed-borne disease *Ascochyta* was very prevalent every year and infection with this fungus rendered the produce unfit to be used as seed. The onions produced practically no seeds, and the leeks set seed very meagrely, particularly in the rather wet autumn seasons of 1943 and 1944. Carrots grew fairly well in the first trial season, but after that the carrot fly caused much damage, and it was difficult to obtain suitable roots for seed production. Seeding of these vegetable crops was not a practicable proposition under conditions at Corstorphine, and this work has been discontinued.

THE HANNAH DAIRY RESEARCH INSTITUTE.

KIRKHILL, AYR.

In the past year research work has been continued in the following subjects :—

Farm Self-sufficiency.—The chief means adopted to achieve farm self-sufficiency in feeding-stuffs have been the growing of increased acreages of arable crops, the improved management and fertiliser treatment of grassland, and the use of modern methods of conserving green crops. Plot experiments have been made to determine the best green crops to use as raw material for drying,

and also to determine the fertiliser treatment which will give maximum yields of protein in the dried products. Beans have proved an excellent crop for increasing the yield of protein on the farm. In order to obtain the maximum benefit from their cultivation the effect of borax dressings on the growth and yield of beans has been studied. Tests have also been made with comfrey as a high protein-producing crop, but it has been found that there are difficulties in the cultivation and conservation of this plant which prevent it from making any valuable contribution to the attainment of farm self-sufficiency in regard to feeding-stuffs.

Animal Husbandry.—Work has continued on the design and fittings of cow byres, and a special study has been made during the past year on problems of ventilation in farm buildings. The young stock has been kept for a second winter in an open straw yard, a system which has again proved to be most profitable. The health of the animals has been well maintained, a large quantity of dung has been produced, and marked economies in labour have been effected.

Diseases of Dairy Cows.—In co-operation with the Agricultural Research Council and the Scottish Board of Veterinary Science, research on many aspects of mastitis has continued, particular attention being paid to the control of the disease. The effect of age of cows and the length of their dry period on the incidence of mastitis in herds is being assessed. Data is also being collected on the incidence of infection at different stages of lactation and on the incidence of infection in the different quarters of the udder. In co-operation with workers at other Institutes the modes of spread of *Strep. agalactiae* infection in dairy herds have been investigated. Further co-operative work is at present in progress on the possibility of using penicillin to control bovine mastitis. The Institute has continued to co-operate in the diagnosis of contagious abortion and sterility.

Nutrition. (a) Metabolism Experiments.—Feeding iodinated protein to dairy cows brings about a temporary increase in the yield of milk and in the percentage of fat in the milk. Little is yet known, however, as to whether continued feeding of iodinated protein over a long period harms the cow or shortens its life. This aspect of the subject is at present being investigated, particular attention being paid to the calcium and nitrogen metabolism of the lactating cow when iodinated protein is included in the diet. The Institute's specially constructed metabolism house is being used for this purpose.

(b) Ruminant Digestion.—At one time it was generally believed that the main functions of rumination were maceration of the feeding-stuffs and cellulose digestion. It is now realised, however, that at least one vitamin may be destroyed in the rumen and

several others synthesised, and that the nature of the nitrogenous constituents of the diet may also be materially altered during their period in the rumen. Extensive experiments on ruminant digestion have therefore been carried out during the past few years, with particular reference to the possibility of protein synthesis from simple nitrogenous substances in the rumen. A thorough knowledge of the changes which take place in the nitrogenous constituents of the diet will make a most valuable addition to existing information on the protein requirements of dairy cows.

The Bacteriology of Milk and Milk Products.—A reliable and yet rapid test for the keeping quality of milk which will be applicable on the creamery platform is urgently required. During the past year a programme of work has been begun in which various tests such as the methylene blue test, the resazurin test, the determination of titratable acidity, and various forms of the alcohol test are being studied at the creamery platform, the standard of reference being the keeping quality of milk at 64° F. as determined by taste, smell, and the formation of a clot on boiling.

Valuable improvements in the technique in use for the bacteriological examination of dried milk powders have been devised and established.

Dried Milk.—Much of the Institute's work on milk powder in the past few years has been carried out to determine to what extent the keeping quality of the powder can be improved by packing the powder in inert gas, by addition of anti-oxidants, and by raising the temperature to which the liquid milk is pre-heated before it is dried. The results of this work have established methods by which the storage-life of full-cream dried milk in temperate climates can be extended from a few months to two years and more. So far the work has been confined almost entirely to a study of the deterioration of the fat in milk powder. It is known, however, that when the moisture content of dried milk is not maintained at a sufficiently low figure protein deterioration sets in. Work on this particular type of protein deterioration has now begun.

THE MACAULAY INSTITUTE FOR SOIL RESEARCH.

CRAIGIEBUCKLER, ABERDEEN.

Problems of immediate importance in agricultural practice with reference to the maintenance of soil fertility and the efficient utilisation of the available lime and fertilisers received special consideration in view of the campaign for increased food production. Special investigations, such as the influence of trace elements in the soil upon plants and animals, were conducted in collaboration with other research institutes. The following summary of the

work carried out indicates the main lines of activity during the year 1945 :—

1. *Soil Fertility*.—The analytical records accumulated during the past few years have been scrutinised and the soils grouped according to the geological origin and manurial status. The soils of the north of Scotland are still deficient in lime and phosphate, and it is thought that a response would also be obtained from application of potash not only for potatoes but for the sow-out crop on land being returned to grass. Reports based upon the analytical data obtained from the examination of 4200 samples of soil were issued during the year in connection with application of lime and fertilisers to arable, horticultural, and forest soils. Investigations upon the relative value of coarse and fine limestones, magnesian limestone, waste limes, and calcareous sand were continued. The study of phosphate fixation was advanced. The problem is still considered to be one of major importance in the efficient utilisation of phosphate supplies. The effects of placement of fertilisers have been observed in field experiments as regards yield and crop. Experiments were also continued to test (a) the value of fertilisers in granular and powdered condition; (b) the manurial value of crushed biotite schist; (c) effects of liming, manuring, green cropping, the use of composts, and partial soil sterilisation upon forest seedlings.

2. *Soil Surveys and Classification*.—The reconnaissance survey (2·5 inches to 1 mile) of Aberdeenshire has almost been completed—320 square miles having been covered. The Countesswells association has been found to be the most extensive, and represents soils developed upon granitic and gneissic boulder clay. About 100 square miles of West Lothian and Midlothian have been partly examined. The area is underlain by igneous and sedimentary rocks and is covered almost entirely by surface deposits of boulder clays, fluvioglacial sands and gravels, and alluvial deposits. Two freely drained soil types on the boulder clay have been distinguished. A detailed survey (6 inches to 1 mile) of thirteen farms has been made at the request of the National Institute of Agricultural Engineering. Mineralogical and chemical examinations were made upon representative samples collected with a view to the identification of the chief soil types.

3. *Soil Organic Matter and Peat*.—The survey of the peat deposits of Scotland in collaboration with H.M. Geological Survey was extended to Caithness and Sutherland. The utilisation of peat in horticultural practice and as a substitute for farmyard manure has received further attention. Peat fortified with artificial fertilisers again proved to be a suitable substitute for farmyard manure when used for a short period. A detailed examination of soil organic matter has been continued in the laboratory with a view to the chemical characterisation of "true humus." During the year the microbiotic changes occurring in plant materials during the process of composting were observed, and the dominant species of micro-organisms present are being studied.

4. *Spectrographic Work*.—The development of arc spectrographic methods for the determination of trace constituents in plant material and soil extracts was continued. Recent work has emphasised that precise knowledge of the conditions is necessary for accurate work in this field of investigation. The results of such work are being employed in a survey of the absorption of elements by various plants grown on soils of varying geological origin. A survey of a series of igneous rocks from the west of Scotland is being made with a view to studying the cause of distribution of trace elements in soils. An increased use of spectrographic methods in connection with routine examination of soils has been made.

5. *X-ray Work*.—The experimental work upon the absorption of substances by pure clay minerals has been advanced. The results obtained have a distinct application in the identification of halloysite in natural clays. In collaboration with the Soil Survey Unit a method for the determination of the amount of water and other substances in specially treated clays has been evolved.

6. *Soil Drainage and Other Investigations*.—The joint work with other Institutions has been continued. The drainage water from the lysimeters situated at Craibstone Experimental Station of the North of Scotland College of Agriculture continued to be collected for analysis. The phosphate status of the special plots undergoing rotational cropping at Craibstone has been further examined. Problems associated with the diseases of stock have been investigated jointly with the Animal Diseases Research Association, while the study of nutritional requirements of trees has been continued with the Forestry Commission.

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.

The following summaries of experimental work deal with some of the problems on which research is being conducted at this College. The work is being done by the Agricultural Advisory Departments which deal with Bacteriology, Botany, Chemistry, and Entomology. The account also includes the main items of the programme of the Veterinary Investigation Officer.

Mastitis in Dairy Cows.—Five herds have now been cleared of infection due to *Strep. agalactiae* by the method of regular testing and disposal of infected cows. In addition, a herd of cows in their first lactation has been tested three times and found to be free from infection with this organism. Additional data confirmed the

low incidence of infection in suckled cows and in cows kept in courts. In the investigation of the influence of season on the incidence of new infections the autumn maximum was again clearly discernible.

Other Diseases of Cattle.—Work has been commenced on calf diseases in collaboration with the Agricultural Research Council, the Royal (Dick) Veterinary College, and the Moredun Institute, Animal Diseases Research Association. Work on the pathogenesis of tuberculosis in cattle is being commenced in collaboration with the Pathology Department of the Royal (Dick) Veterinary College.

Sheep Diseases.—Work on abortion of ewes is continuing. There would appear to be several types of abortion in ewes in the east of Scotland, and in consequence a survey of the incidence and occurrence of abortion in this area is being carried out. At the same time complete pathological and bacteriological examinations of aborted ewes are being conducted to determine if possible any causal agencies. In addition, attempts to reproduce the condition experimentally are being made.

Other field investigations include sheep dipping trials and trials with "Orf" vaccination.

Sheep Tick Investigation.—The question of the differential seasonal periodicity of the sheep tick on Border hill-farms and on those of Central and North-east Scotland has been examined. On the Borders there is a single climax of infestation in the spring, whereas, elsewhere, there is an autumn as well as a spring climax. No evidence has materialised in support of the theory that the sheep tick exists in distinct biological races. The difference in their seasonal behaviour appears to be a function of the climatic conditions, temperature, &c., in different parts of the country.

Experiments on the efficacy of D.D.T. dips in the control of the tick and the sheep blowfly have been planned for 1946.

Failures in Field Beans.—In field experiments applications of hydrated lime and of calcium sulphate produced a marked improvement in the growth and nodulation of the plants. At one centre the application of a culture of *B. radicola* resulted in an improvement in growth and nodulation on the plots treated with lime. Further data confirmed the correlation of failures with low content of replaceable calcium in the soil.

Green Manuring Experiments.—In undersowing experiments begun in connection with straw utilisation, promising results were obtained with Red Clover and Italian Ryegrass sown under wheat and oats. Trefoil was severely restricted by the high lime requirement of many of the soils. The return of organic matter and nitrogen to the soil in the form of stubble and undersown grass or legumes is also being studied.

The Calcium Status of Soils.—Liming experiments on beet and turnips have demonstrated that ground limestone is as effective as an equivalent amount of ground lime, and that, on a very acid soil, adequate liming is essential to obtain a response to phosphate. It has again been found that many samples of lime are of greater value for reducing soil acidity than analysis by the official method would indicate.

The Work of the Chemistry and Advisory Soils Departments.—A total of 7541 samples, consisting of 5049 soils, 75 fertilisers, 464 feeding-stuffs, and 1953 milks, was analysed during the year. Most of the soil samples were from farms, but a survey of market garden soils has been started to obtain information on the limiting values for nutrients under these conditions of intensive cultivation. A special examination of potato soils is also being carried out in connection with the investigation on dry-rot.

The Composition of Hay, Potatoes, and Growing Crops.—The examination of seeds hay, made under excellent conditions on twenty-two Lothian farms, showed that the average content of crude protein was only 5.4 per cent or much lower than the figures commonly used in estimating the food value of hay.

The investigation on the sugar concentration in potato tubers is being continued, and a considerable amount of analytical data on the composition of leaves of growing crops is being collected for the purpose of helping in the diagnosis of nutrient deficiencies.

Greenflies in Market Garden Crops.—Investigation of the factors which determine the variation of incidence of infestation of aphids on market garden crops was continued in 1945. By a sticky trap device exposed in the open it is proposed to obtain more accurate information on the kinds of aphids present in the Lothians and their seasonal movements in relation to crops.

Glasshouse Pests.—Time was devoted to the study of caterpillar pests of tomatoes and chrysanthemums, including the Tomato Moth, Angle Shades, and the Pearly Underwing.

Biting Midges.—In collaboration with workers at Aberdeen, Dundee, and Glasgow an investigation was begun of the biting midges throughout Scotland for the purpose of enlarging the meagre knowledge of their habits and places of breeding, and with a view to devising a means of control. As a result of the first season's work an effective repellent agent was found for protecting outdoor workers exposed to attack.

Weed Destruction.—Field trials with the new selective weed killer Methoxone gave highly satisfactory results with certain weeds, particularly charlock and runc. A number of other species showed varying degrees of resistance.

THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE.

ABERDEEN.

The following are examples of the type of experimental work being carried out :—

Grassland Management.—Experiments on the improvement of hill grazing showed that in order to get the maximum economic return by way of improved winter grazing for sheep, it is necessary to control the grazing at certain periods of the year with a view to encouraging the better plants, and thus enable them to persist in a vigorous condition for a considerable number of years. For this purpose it is very important to have cattle grazing during the summer months on those areas of the hill which have been improved by ploughing and reseeded.

Experiments to test the efficiency of direct reseeded to grass without a nurse crop as a method of replacing the turnip crop were found most encouraging. They showed this method to be a most practical one in getting rid of arable weeds without any expensive labour for hoeing. It eliminated practically all the weeds, both annual and perennial, with the exception of docks, and gave rise to a high quality pasture in an interval of only a few weeks.

Veterinary Investigations.—Investigation has continued into the ætiology and pathology of bovine parturient hæmoglobinæmia, together with a biochemical study in association with the Animal Diseases Research Association.

Further study continues on the ætiology of scouring diseases in the north-eastern seaboard of Aberdeenshire and Banffshire.

An experiment is in progress on the association of tick-borne fever with abortion in sheep. A preliminary experimental investigation is being carried out in association with the Rowett Research Institute and the Macaulay Institute on the effect of a suspected copper-deficient pasture on animal health.

Experimental Department.—Trials have been carried out with all the varieties of the different farm crops, new varieties or strains being added as they are raised. Among other trials are the time of sowing or planting, standing power of grain, manurial trials throughout the rotation, grass seed mixtures, and selection of healthy stocks of potatoes.

Entomological Research.—Research and progress by this Department includes the following :—

- (1) Control of the sheep tick (*Ixodes ricinus* L.) on a moor by heather burning, drainage, and systematic moor management. Experiment started in 1940.

- (2) Survey of greenflies (*Aphididae*) of the region, particularly those associated with insect-borne virus diseases of potatoes.
- (3) Classification, bionomics, and control of British glasshouse *Thysanoptera* (thrips).
- (4) Various aspects of diseases of adult honey bees and brood.

Agricultural Botany Department.—The experimental work of this Department during 1945 was concerned with the following problems :—

Pasture trials on peat.
 Blind seed disease of ryegrass.
 Potato blight and storage rots.
 Eradication of annual weeds in corn crops by spraying with chemicals.

THE WEST OF SCOTLAND AGRICULTURAL COLLEGE.

MILK UTILISATION DEPARTMENT.

Graded Milks.—The importance of purity in farm water supplies on graded farms is again stressed. In one particular case where Certified Milk was being produced the farm cooler and milking units became contaminated with coliform organisms at evening rinsing. In another case of a certified farm the coliform organisms were present in the farm inspection. The milk cooling equipment became continuously reinfected and the licence was threatened.

A large number of milk samples received from a south of Scotland county was examined at the time of arrival in the afternoon. The samples were then cooled and stored overnight at 40° F. to be re-examined the following morning. There was no significant difference in the two sets of results, which means that there is no ground for criticising the practice of sampling as carried out in the official inspection in which samples are sent to Dumfries to be plated the following morning.

Milking Machine Investigation.—The comparative working life-time of milking machine teat cup liners made from (a) natural and (b) synthetic rubber was investigated in a trial at the College Experimental Farm. Both types seem to withstand equally well the daily steam sterilising, and the bacteriological quality of the milk was satisfactory in both cases. In working practice, however, the liners made from natural rubber were found vastly superior to those manufactured from the synthetic rubber. From the second day of the trial difficulty was experienced with the synthetic rubber. Liners failed to retain their shape, making fitting impossible, and trouble followed through the tearing of the liners during fitting

and manipulation. The average lifetime of natural rubber was eleven weeks against one of under five weeks for synthetic rubber.

Cheese Discoloration.—The serious blackening of white cheese which was otherwise of first quality referred to in last year's survey has received further attention. The black cheese contains a greatly increased content of iron in comparison with that normally found in cheese. The ability of the causal organism to produce a black pigment under abnormal metallic conditions is being investigated.

Phosphatase Tests for Official Purposes.—There would seem to be some lack of agreement on results when the phosphatase test is applied to the same milk in different laboratories by different workers. Co-operative work of this department failed to agree with work of public analysts working on official samples. The test appears to require further examination.

ANIMAL HUSBANDRY DEPARTMENT.

The Effect of Nutrition on the Health and Milk Yield of Dairy Cows and on the Health and Growth of their Progeny.—Twenty-four winter and spring-calves cows have been housed in one-half of the large byre at Auchincruive. They are divided into two groups of twelve; one group being fed on a typical war-time diet, including grass silage, the other on a typical pre-war diet.

The experimental rations have been fed from the end of November until the end of March, and the rations of the two groups are balanced for starch equivalent and protein equivalent, although their vitamin and mineral contents are different.

Analyses have been made at intervals of the vitamin C, vitamin A, and carotene content of (a) the blood of the cows, (b) the blood of the calves, (c) the colostrum, and (d) the milk. Observations have been made on the general health and condition of the cows and the calves. The total amount of food-stuffs fed and the daily milk yield have also been reported.

The Requirements of Calves for certain Vitamin Factors for Normal Growth and Health.—The male progeny of cows in the Auchincruive herd along with calves from certain other dairy herds—twelve to twenty each month—are being reared on experimental rations for determination of the vitamin requirements of calves.

Fertility in Hill Cattle.—The Highland and Highland-Shorthorn cows in this experiment calved during April, May, and June 1945, and general observations were made on their condition and on the health and growth of the progeny.

Samples of herbage were obtained at monthly intervals from representative parts of the grazing during the summer and early autumn. Analysis showed that during the summer months the

phosphate (P_2O_5) content of the herbage rose to only 0.37 per cent. This indicates a state of phosphate deficiency in the grazing almost as severe as the deficient pastures of South Africa.

Those groups—160 cattle in all—which received a complete mineral mixture containing 50 per cent bone meal produced a greater calf crop (80 per cent) compared with (1) previous crops on the same grazing (63 per cent), and (2) control groups—50 animals—which received no supplements (58 per cent). Symptoms of aphosphorosis evident in previous years and in the control groups of the experiment were absent in the mineral treated groups.

Influence of Geology on the Health of Grazing Animals.—Samples of herbage were collected at monthly intervals from three grazings in South Ayrshire. On two of these grazings there is a high incidence of the disease head grit amongst the lamb crop each year. On the other grazing head grit is unknown, but lies in close proximity to grazings where the incidence of head grit is high. These samples have been forwarded to the Macaulay Institute for Soil Research, Aberdeen, for spectrographic analysis to determine differences in the trace element composition of the samples.

Cobalt-Deficient Hill Grazings. (a) Fertility.—The County Organisers of the College collaborated with the Department in the collection of the data of this investigation. Details were obtained from ninety-five farms in all counties of the College area of the effect of cobalt supplementation of the diet of the ewes previous to tupping on their fertility in the following year. Marked increases in (1) the number of lambs born and (2) marking counts were observed in many of the treated groups of sheep in every county. Lambing was also completed much sooner—up to three weeks—in the experimental group than in the controls.

(b) Growth of Lambs.—On eight separate grazings of varied soil type in South Ayrshire, lambs were dosed at intervals from marking onwards with solutions of (1) copper and cobalt and (2) cobalt, while an equal number served as controls. Periodic weighings of the experimental lambs were obtained throughout the summer and autumn while they were on the grazing, and the results showed significant increases in weight on all soil types following treatment.

(c) Wool Quality.—On two farms in Argyllshire, which lie outside the recognised pinning areas, ewes received supplemental cobalt (1) previous to tupping, (2) before lambing, and (3) at the lamb marking. The results showed that a 30 per cent increase in fleece-weight was obtained by this treatment on those farms. Representative fleece samples were despatched to the laboratories of the Wool Industries Research Association at Leeds for analysis, but no difference in wool quality was observed on any of the treatments.

Nutrition of Tup Hogs during Winter.—The experiment on the need for the addition of minerals and vitamins to the diet of Black-

face ram lambs during the winter months was repeated. Sixty-two animals were included in the experiment. Thirty ml. of cod liver oil or linseed oil were administered once per week to forty-six animals fed indoors. Sixteen animals were grazed on rich permanent pasture and received the same supplements. None of the house-fed animals developed "bent-leg," but four of the eight animals at pasture which received no vitamin supplements developed gross symptoms of the deformity. Blood analysis showed that the blood calcium of this group of animals was less than 10 mg. per 100 ml. in every case, while the two groups, indoors and at pasture, receiving vitamin supplements, showed a concentration of over 11 mg. Ca per 100 ml. The indoor animals receiving linseed oil, while they exhibited no symptoms of "bent-leg," showed a slightly lower concentration of blood calcium (10-11 mg. per 100 ml.) than the animals receiving vitamin supplements. These results confirm New Zealand findings which show the need for the addition of weekly supplements of cod liver oil to the diet of ram lambs during the winter and spring months of the year.

Artificial Insemination of Sheep. (a) *South Ayrshire.*—With a view to obtaining information on the feasibility of artificial insemination of hill sheep stocks, some fifty ewes on hill sheep farms were inseminated artificially every twenty-four hours while in oestrus during November.

(b) *Iceland.*—In collaboration with the Secretary of the Federation of Icelandic Agricultural Societies samples of semen were obtained daily from ten Cheviot and Blackface rams maintained at Auchincruive, and these were transported by 'plane from Prestwick Airport to Iceland two or three times each week during December and January. The Icelandic A.I. Station of Reykjavik University took over the samples on arrival for insemination into ewes on the Icelandic farms. Over a thousand doses of semen were despatched to Reykjavik.

ROYAL (DICK) VETERINARY COLLEGE.

EDINBURGH.

DEPARTMENT OF PATHOLOGY.

Five papers dealing with disease in animals as revealed by a scrutiny of the laboratory records have been published and others are in the press.

Pathology Section.—Work on bovine mastitis during the past year has had three main objects. Firstly, to establish, in conjunction with workers at the West of Scotland Agricultural College, the significance of the finding of high cell counts in the milk of animals not showing pathogenic bacteria. Secondly, an endeavour is being made to determine what constitutes the normal cell count

in bovine milk. Thirdly, an investigation is being made into the behaviour within the udder of various substances after their introduction via the teat, as in udder irrigation. The normal structure of the mammary gland is being investigated by special methods, and work on tuberculosis of the genitalia in the bovine is in progress. The methods of dissemination of the tubercle bacillus in the animal body are being studied.

Bacteriology Section.—Further work has been done on the hæmolytic streptococci of domesticated animals. An investigation into the efficiency of vaccines in combating these infections is in progress. The work on Johne's disease in a self-contained herd is continuing.

Poultry Diseases Section.—Further work on the neoplastic diseases of the domestic fowl has been done. The relationship between fowl paralysis and lymphoid leucosis is being investigated. Cochlosomiasis in turkeys—the first case of this disease in turkeys—has been investigated and reported.

DEPARTMENT OF SURGERY.

Work on the disabling diseases of horses is continuing, and observations have been made on the effects of a lack of vitamin C on ponies fed on a Ca : Ph unbalanced diet.

DEPARTMENT OF MEDICINE.

Work on fluorine poisoning has been continued, and some observations have been made on dental conditions in sheep. The study of diagnostic methods in veterinary medicine is being further developed.

DEPARTMENT OF PHYSIOLOGY.

The investigation of carbohydrate metabolism in domesticated animals is continuing. Some experiments have also been carried out on the rate of uptake of oxygen by equine blood in vitro.

DEPARTMENT OF ANATOMY.

Papers have been published dealing with the adrenal gland of the horse; an anomalous vena cava in the dog; and the ureter and blood supply to the kidney of a variety of animals.

DEPARTMENT OF HYGIENE, DIETETICS, AND ANIMAL HUSBANDRY.

An investigation is being made into the chemical composition of pasture at different stages of growth, with particular reference to nitrogenous and mineral constituents. Observations have also been made on the effects of changes of diet on the metabolism of domesticated animals.

MILK RECORDS.

FORTY-THIRD YEAR—RECORDS OF 61,056 COWS.

By JAMES A. PATERSON, Superintendent-Secretary,
The Scottish Milk Records Association.

THE year 1945 has shown a considerable expansion in the work of the Scottish Milk Records Association. The number of cows tested was 61,056, being 13,318 in excess of the 1944 figure, and the greatest number ever tested under the Association's scheme. Considerable difficulties were experienced in regard to labour, equipment, and the supply of alcohol and acid, but the Association were nevertheless able to maintain the control which has been a feature of the Scottish system of recording since its inception.

During the war years the supervision work was carried out by a Superintendent-Secretary, who acted in a part-time capacity. Towards the end of the year the Association decided that, with the expansion in the work, it was essential that there should be a full-time official in charge, and Mr James A. Paterson, who had acted in a part-time capacity, was appointed Superintendent-Secretary on a full-time basis.

In the earlier part of the year, in order to supervise the work of the individual milk recorders more thoroughly, additional assistant superintendents were appointed. The Association have also obtained extensive office accommodation, and it has been possible to increase the purely administrative staff so that the work of checking and compilation of records can be speeded up. With alterations in the method of compilation it is hoped that the Association will be able to provide data on milk recording which will be of considerable use to research workers, and will enable dairy farmers to make a much better use of the information obtained from milk recording.

Milk recording operated in 1945 on the same lines as formerly—namely, through local Milk Recording Societies, which are formed in all parts of Scotland where milk recording is practised. Seventeen such Societies operated, and the following is a list of the names and addresses of the Secretary of each :—

Name of the Society.	Secretary.
Arran	Mr J. M'Alister, Bellevue, Sliderry.
Central and South Ayrshire (8 Circuits)	Mr E. A. Bell, M.A., B.Sc., 2 Miller Road, Ayr.
Central Ayrshire No. 2 .	Mr George F. F. Smith, Union Bank, Kilmarnock.
Central Scotland (6 Circuits)	Mr Arthur Gilmour, C.A., 23 Silvergrove Street, Glasgow.
Dumbartonshire (2 Circuits)	Mr Robert Bilaland, 35 Wylie Avenue, Alexandria.
Dumfriesshire (5 Circuits)	Messrs Henderson & Mackay, Solicitors, Lockerbie.

Name of the Society.	Secretary.
East Lothian and Border (3 Circuits)	Messrs Inglis, Orr, & Bruce, 19A Hill Street, Edinburgh.
Fife (3 Circuits)	Mr F. Dow, Commercial Bank, Thornton, Fife.
Highland	Mr J. M. Hunter, Queensgate, Inverness.
Kintyre	Mr J. Maxwell M'Donald, Largie Estate Office, Tayinloan, Kintyre.
Lesmahagow	Mr Thomas MacKail, British Linen Bank, Lesmahagow.
Machars (2 Circuits) . .	Mr James Gordon, Black Bull Hotel, Newton Stewart.
North Ayrshire (John Speir) (3 Circuits)	Mr George F. F. Smith, Union Bank, Kilmar-nock.
North of Scotland (4 Circuits)	Mr Robert C. May, Advocate, 77 Crown Street, Aberdeen.
Renfrew and Bute (2 Circuits)	Mr Thomas Hunter, Solicitor, 35 High Street, Paisley.
Rhins of Galloway (5 Circuits)	Mr W. Brown Moir, Cairnslea, Stranraer.
Stewartry of Kirkcudbright (5 Circuits)	Mr Patrick Gifford, Solicitor, Castle-Douglas.

Each local Society is represented on the Association in accordance with the number of circuits operated by the Society, and in addition the various Breed Societies, Agricultural Colleges, and Research Institutes are represented. For 1945 the Association consisted of the following :—

Name and Address.	Body Represented.
Mr Jas. Currie, Drumadoon, Blackwaterfoot	Arran.
Mr E. A. Bell, Blairston Mains, Alloway .	
Mr John Lockhart, Stair House, Mauchline	
Mr William Wallace, Lyonstone, Maybole .	
Mr R. H. U. Stevenson, Corseclays, Ballantrae	Central and South Ayrshire Milk Recording Society (8 Circuits).
Dr A. B. Fowler, B.Sc., Hannah Dairy Research Institute, Kirkhill, Ayr	
Mr J. Templeton, Willoxton, Mauchline .	
Mr D. M'Kerrow, Croftfoot, Sorn	
Mr Thomas Black, Balig, Ayr	Central Ayrshire No. 2 Milk Recording Society.
Mr George Templeton, Carnell Home Farm, Hurlford	
Mr Thomas Pettigrew, Hairmyres Hospital, East Kilbride	
Mr R. Lohoar, Greenlees, Cambuslang .	
Mr T. H. Ballantyne, Woods, Auchenheath .	Central Scotland Milk Recording Society (6 Circuits).
Mr Thos. Johnstone, Standalane, Falkirk .	
Mr M. Bowie, Balmuldy, Maryhill . . .	
Mr W. M'Lachlan, East Crookedstone, Quarter	
Mr Robert Watt, Milligs Farm, Helensburgh	Dumbartonshire Milk Recording Society (2 Circuits).
Mr G. P. Ross, Three Oaks, Fintry . . .	
Mr M. Sloan, Hunterhouse, Lochmaben .	
Mr J. Hardie, Nether Keir, Auldirth . .	
Mr J. Young, Mouswald Grange, Collin .	Dumfriesshire Milk Recording Society (5 Circuits).
Mr W. Sloan, Shawsmuir, Closeburn . .	

Name and Address.	Body Represented.
Mr David S. Clark, Bellshiel, Duns . . .	East Lothian and Border Milk Record- ing Society (2 Circuits).
Mr R. Chalmers Watson, Fenton Barns, Midlothian	
Mr G. W. Lambie, Nether Pratis, Leven . .	Fife Milk Recording Society (3 Circuits).
Mr J. W. Clement, East Pitkeirrie, Anstruther	
Mr W. Young, Jun., Craigencait, Kinghorn .	Highland Milk Recording Society.
Mr A. Munro, Dell of Inshes, Inverness .	
Mr R. Miller, Auchaleek, Campbeltown .	Kintyre Milk Recording Society.
Mr T. B. M'Gregor, Lesser Linn, Lanark .	Lesmahagow Milk Re- cording Society.
Mr John Wallace, Whitehills, Sorbie . .	Machars Milk Recording Society (2 Circuits).
Mr Jas. Howie, Jun., Eglinton Mains, Irvine	North Ayrshire (John Speir) Milk Recording Society (3 Circuits).
Mr J. M. Matthew, Girthill, Saltcoats . .	
Mr Thomas Murdoch, West Tannacrieff, Kilmarnock	North of Scotland Milk Recording Society (4 Circuits).
Mr James A. Stephen, Conglass, Inverurie .	
Mr A. Spence, Commieston, Montrose . .	Renfrew and Bute Milk Recording Society (2 Circuits).
Mr J. R. Barron, Findowrie, Brechin . .	
Mr R. C. May, 77 Crown Street, Aberdeen .	Rhins of Galloway Milk Recording Society (5 Circuits).
Capt. Ian S. Robertson, Linkwood, Elgin .	
Mr Robert Howie, Flatterton, Greenock .	Stewartry Milk Record- ing Society (5 Circuits).
Mr John Raeside, Hattrick, Kilmalecolm .	
Mr John Forster, Mains of Larg, New Luce	The Ayrshire Cattle Herd - Book Society of Great Britain and Ireland.
Mr A. N. M'Caig, Challock, Stranraer . .	
Mr J. Murray, Beoch, Stranraer . . .	The Highland and Agri- cultural Society of Scotland.
Mr J. M'Intyre, Logan Mains, Stranraer .	
Mr A. R. M'Caig, Caldons Hill, Stranraer .	The British Friesian Cattle Society.
Capt. J. M. Gilmour, Chapelton, Borgue .	
Mr J. G. Baird, Kirkchrist, Kirkeudbright .	The West of Scotland Agricultural College.
Mr R. Dunlop, Middelton, Castle-Douglas .	
Mr J. G. M'Myn, Kirkhouse, Kirkbean .	The Edinburgh and East of Scotland College of Agriculture.
Mr J. M'Gill, Hillowton, Castle-Douglas .	
Col. W. T. R. Houldsworth, Kirkbride, Maybole	
Mr A. W. Montgomerie, Westburn, Cam- buslang	
Mr James Howie, Muirside, Dumfries . .	
Dr A. B. Fowler, B.Sc., Kirkhill, Ayr . .	
Mr James Kilpatrick, Craigie Mains, Kil- marnock	
Captain Ian S. Robertson, Linkwood, Elgin .	
Mr Jas. Wither, Awhirk, Stranraer . .	
Mr W. J. Kilpatrick, Muirhouse, Kilmar- nock	
Mr Thomas Johnstone, Standalane, Falkirk .	
Mr James Dunlop, Midland, Prestwick . .	
Mr J. S. Stevenson, Balig, Ballantrae . .	
Mr John Kirkwood, B.Sc., N.D.A., 6 Blyth- wood Square, Glasgow	
Dr A. M. Smith, 13 George Square, Edin- burgh	
Mr J. A. More, 10 George Square, Edin- burgh	

Name and Address.	Body Represented.
Mr John C. Grant, Veterinary Department, Marischal College, Aberdeen	The North of Scotland College of Agri- culture.
Mr Arthur R. Wannop, B.Sc., B.Eng., 41½ Union Street, Aberdeen	
Mr M. Mackie, North Ythsie, Tarves . . .	
Mr John Forster, Mains of Larg, New Luce .	Animal Diseases Research Association.
Mr W. Cassels Jack, Glenpark, Braxfield Road, Lanark	
Dr Norman C. Wright, M.A., Ph.D., Kirkhill, Ayr	The Hannah Dairy Re- search Institute.
Dr A. B. Fowler, B.Sc., Kirkhill, Ayr . . .	
Sir Guy Shaw-Stewart, Ardgowan, Inverkip	Co-opted Members.
Lord Rowallan, Rowallan, Kilmarnock . .	
Mr John Speir, 81 Hope Street, Glasgow . .	
Mr Alan Barr, Hobsland, Monkton . . .	
Dr Chalmers Watson, Fenton Barns, Drem .	

Chairman—Col. W. T. R. Houldsworth.

The following were the principal members of the staff :—

Superintendent-Secretary—Mr James A. Paterson.

Assistant Superintendents { Mr Percy H. Hart.
Mr John Mc'Nicol.
Miss Mary Jamieson.

During the year 1205 herds were officially recorded, and, as previously stated, 61,056 cows were officially tested, and the following list shows the number of herds and the number of cows in each local Society or circuit, along with the interval between tests and the duration of the recording season :—

Name of the Society or Circuit.	No. of Herds.	No. of Cows Tested.	Average Interval be- tween Tests, in Days.	Duration of Recording Season, in Weeks.
1. Arran	23	401	28	52
Central and South Ayrshire—				
2. Ayr and Drongan	22	846	27	52
3. Cumnock	23	915	28	52
4. Dalrymple	23	875	28	52
5. Girvan	24	1253	28	52
6. Kilmarnock	25	1070	29	52
7. Maybole	24	1065	28	52
8. Ochiltree	22	810	27	52
9. Tarbolton	23	961	28	52
10. Central Ayrshire No. 2	22	1077	27	52
Central Scotland—				
11. Dunblane	24	1024	28	52
12. East Kilbride	25	1174	29	52
13. Falkirk	25	1008	29	52
14. Hamilton	22	1014	27	52
15. Strathaven	22	1124	27	52
16. Strathendrick	22	1367	29	52
Carry forward	371	15,984	...	...

Name of the Society or Circuit.	No. of Herds.	No. of Cows Tested.	Average Interval between Tests, in Days.	Duration of Recording Season, in Weeks.
Brought forward . . .	371	15,984	...	...
Dumbartonshire—				
17. Dumbarton No. 1 . . .	21	873	26	52
18. " No. 2 . . .	20	924	25	52
Dumfriesshire—				
19. Dumfries—No. 1 . . .	23	1184	28	52
20. " No. 2 . . .	22	939	27	52
21. " No. 3 . . .	23	1248	28	52
22. " No. 4 . . .	23	1238	28	52
23. " No. 5 . . .	22	991	27	52
East Lothian and Border—				
24. East Lothian and Border—No. 1	20	967	25	52
25. " No. 2	22	1118	27	52
26. " No. 3	23	712	28	52
Fifeshire—				
27. Fife—No. 1 . . .	20	1202	25	52
28. " No. 2 . . .	23	1153	28	52
29. " No. 3 . . .	20	860	25	52
30. Highland . . .	24	1060	30	52
31. Kintyre . . .	24	1014	28	52
32. Leamnahagow . . .	25	1042	29	52
33. Machars—No. 1 . . .	24	1608	29	52
34. " No. 2 . . .	26	1352	30	52
North Ayrshire (John Speir)—				
35. Fenwick . . .	21	1145	26	52
36. 'John Speir' . . .	25	1076	29	52
37. Stewarton and Montgomerie	25	1182	29	52
North of Scotland—				
38. North of Scotland—No. 1 . .	24	1635	30	52
39. " No. 2 . . .	24	1635	30	52
40. " No. 3 . . .	25	1165	30	52
41. " No. 4 . . .	25	1921	30	52
Renfrew and Bute—				
42. Bute and Kintyre . . .	26	768	30	52
43. Paisley . . .	27	1245	30	52
Rhins of Galloway—				
44. Kirkcolm . . .	19	1394	26	52
45. Kirkmaiden . . .	16	1298	28	52
46. Luce Valley . . .	19	1429	25	52
47. Stoneykirk . . .	20	1288	27	52
48. Stranraer . . .	20	1081	26	52
Stewartry of Kirkcudbright—				
49. Stewartry—No. 1 . . .	24	1708	28	52
50. " No. 2 . . .	24	1559	28	52
51. " No. 3 . . .	22	1482	28	52
52. " No. 4 . . .	21	1205	27	52
53. " No. 5 . . .	22	1371	28	52
Total No. . .	1205	61,056	...	...

METHOD OF RECORDING.

The milk records compiled by the Association are records of the estimated quantity of milk produced by each cow in a separate

lactation and of the estimated percentage of milk fat contained in the milk. For convenience, a gallon of milk is reckoned as 10 lb.

The milk yields are estimated in respect of quantity and milk-fat percentage from the results of systematic periodic tests by trained recorders approved by the Association. The recorders visit the farms for this purpose at intervals varying from twenty-one to twenty-eight days, and each day of visit is regarded as the middle day of the period covered by the test. Milk records estimated in this way approximate closely to the actual milk yields.

A distinctive feature of milk recording in Scotland is that the official records are entirely the work of trained official recorders who are the employees of the Association. Recorders have previously to undergo a special course of training in milk recording at the West of Scotland Agricultural College or other approved College of Agriculture. Only candidates of good character and good general education are selected to attend these courses, and all recorders before appointment must obtain a certificate of proficiency.

All dairy farmers taking advantage of the Association's scheme are arranged into local Milk Recording Societies, the Executive Committee of the Association having power to transfer members from one local Society to another, in order to find accommodation for new applicants and at the same time avoid overlapping of recorders' circuits.

The official recorder arrives at the farm in the afternoon, and is accommodated at the farm overnight. All cows giving milk in each herd, as far as possible, are included in the records. Each cow is clearly distinguished in the byre by a stall number on the wall immediately in front of and above the level of the cow, and registered animals are also indelibly tattooed on the ears with distinctive registered tattoo markings. The cows are milked in the same rotation, evening and morning, on the occasion of the recorder's visit. The recorder weighs and samples the milk of each cow in the evening, noting the time at which each cow is milked, and enters the results in the corresponding columns in the byre sheet, taking up a position in the byre as near to the milkers as possible, so as to have them in full view and, as far as practicable, receiving the milk direct from the milker at the cow's side. He or she again weighs and samples the milk of each cow in a similar manner in the morning, and enters the results in the byre sheet. A mixed evening and morning proportionate sample of milk for each cow is then tested by the Gerber method, for percentage of milk fat. The recorder is required to see that all milk samples and byre sheets are securely locked up overnight or during his or her absence. From the daily results the recorder calculates and completes the byre sheets, multiplying the yields by the exact number of days which have elapsed since the last test, but so calculating throughout that each day of the visit is regarded as the middle day of the period covered by the test. Special ready-reckoners are used to facilitate calculating and to ensure greater accuracy.

The byre sheets are written out in duplicate. The principal copies are posted at regular intervals to the office of the Association,

and the second copies left with the respective members. The recorder transfers the results from the extended byre sheets to the milk record book for the herd indelibly in ink, each cow being assigned a separate page, at the top of which full particulars of the cow are entered, including the indelible tattoo marks on the animal. Visits of inspection are made to each recorder and to the members of local Societies at the different farms periodically throughout the year by members of the Association's staff, and reports thereon submitted to the Executive Committee.

During the year a number of surprise tests are made by the Association's staff in order to check the recorder's work. Re-tests of the milk samples already tested by the recorder are also carried out; for this purpose recorders are instructed to retain the milk samples each morning till ten o'clock.

All records are closed at the end of December, the current lactations being carried forward to the new books of the following year. Finally, summary sheets are written out in duplicate showing the total milk yield for each cow for the lactation or part lactation, with full particulars of the cow, dates of calving, &c. The principal copy of the summary sheet is posted to the Association's office with the record book, and the second copy left with the owner of the herd.

All record books and summary sheets are carefully revised, corrected in detail, and initialed in the Association's office during the next few months, the record books being returned later to the respective members and the summary sheets retained and bound for future reference.

The milk records are next classified into three groups for cows and heifers respectively. Experience has confirmed the view that the most useful comparison is obtained by reckoning the yields in terms of pure butter fat. Such a comparison takes into consideration both the quantity and the quality of the milk.

Cows with a milk record equivalent to not less than 280 lb. of butter fat, and heifers with a milk record equivalent to not less than 224 lb. of butter fat, are grouped in Class I. Cows and heifers with milk records of less than two-thirds of these amounts—viz., 186 and 149 lb. of butter fat respectively—are grouped in Class III.

The following short table shows the corresponding values of these yields in fairly good milk of 3.5 per cent milk fat:—

Class.	Yield of Butter Fat. (Lb.)	Corresponding Yield in Milk of 3.5 per cent Fat. (Gallons.)
Cows in Class I. .	Not less than 280 .	800
Heifers in Class I. .	Not less than 224 .	640
Cows in Class III. .	Less than 186 .	531
Heifers in Class III. .	Less than 149 .	426

All cows and heifers with milk yields falling between these limits come into Class II. Such animals naturally claim less attention than the good milkers or the obviously unprofitable animals. It should be noted, however, that Class II. includes a certain number of unclassifiable yields, as there are a number of cases where, for various causes, the results of a whole normal lactation cannot be obtained.

Finally, there is prepared tables showing the number of cows tested in each herd in each circuit, and also showing the percentage of Class I. and Class III. animals. In these tables the name of the herd is not given, but is distinguished by a letter of the alphabet. Each recording herd owner is provided with a copy of the table for his particular circuit, and is informed as to the letter which represents his herd. A herd owner is therefore in a position to compare his own results with that of the remaining members of the circuit, although he cannot be sure of their actual identity.

PROSPECTS FOR 1946.

The demand for milk recording has continued, and since the beginning of 1946 14 new circuits have been put into operation, bringing the total number up to 67, and the number of members to 1434, an increase of 229 since the beginning of the year. The position in regard to labour and equipment has eased a little, and it is anticipated that the number of cows under test by the end of the year will be in the region of 75,000.

ANALYSES FOR MEMBERS DURING 1945.

By MARSHALL J. ROBB, B.Sc., F.R.I.C., AND JOHN E. RITCHIE, M.A.,
B.Sc., F.R.I.C., Aberdeen.

THE samples sent in for analysis during the year may conveniently be considered under the headings of Fertilisers, Feeding-stuffs, Milks, Waters, Examinations for Poisons, and Miscellaneous.

FERTILISERS.

Of the fertilisers received,¹ compound manures were in the majority, samples of grain manure, potato manure, and turnip manure having been analysed. Other samples received were of superphosphate, hoof, horn and bone meal, charred bone meal, limestone, and ground lime. It may be noted that for the 1945 season, potash was allowed in the turnip fertilisers, the average proportion found in the samples analysed being about 6 per cent. As regards potato manures, the potash content was frequently as high as 12 per cent, a proportion higher than was normally present in this type of fertiliser in pre-war days. At one period of the year under consideration the supply of potash was rather difficult owing to the shipping situation aggravated by the dockers' strike.

The following table (Table I.) gives the results of analyses of the compound fertilisers :—

TABLE I.

	Nitrogen.	Soluble phosphoric acid.	Insoluble phosphoric acid.	Potash.
Turnip manure	4.46	9.57	5.34	6.14
Turnip manure	4.16	10.31	4.42	6.00
Turnip manure	4.08	9.82	6.02	5.62
Turnip manure	4.13	8.64	8.28	..
Early potato manure . .	8.21	7.28	0.65	7.92
Late potato manure . .	9.67	5.80	0.98	4.37
Potato manure	6.28	6.50	1.40	12.22
Potato manure	9.29	6.28	1.19	4.40
Potato manure	5.35	11.57	0.61	..
Potato manure	6.49	8.14	1.81	12.23
Grain manure	4.28	12.58	4.23	..
Floor pickings	2.69	7.30	3.59	6.00

The samples of turnip manure had an average composition of 4.21 per cent nitrogen, 9.08 per cent soluble phosphoric acid, 6.01 per cent insoluble phosphoric acid, and 5.92 per cent potash ; while

the manures intended for the potato crop had averages of 7.55 per cent nitrogen, 7.58 per cent soluble phosphoric acid, 1.11 per cent insoluble phosphoric acid, and 8.23 per cent potash.

The samples of ground limestone were of varying grades, the proportions of calcium carbonate ranging from 79.51 to 98.48 per cent. A sample of ground shell lime contained 57.06 per cent of caustic lime.

Samples of superphosphate were found to be within the limit of variation for a guarantee of 18 per cent soluble phosphoric acid.

A sample of bone meal, damaged by charring, was found to contain 0.4 per cent of nitrogen and 36.23 per cent of total phosphoric acid. The effect of the charring had been to lower the nitrogen content and increase that of phosphoric acid, thus making the composition of the fertiliser comparable with steam bone flour. Ordinary bone meal contains about 4 per cent nitrogen and 20 per cent phosphoric acid.

The hoof, horn, and bone meals analysed contained over 8 per cent nitrogen and about 10 per cent insoluble phosphoric acid.

FEEDING-STUFFS.

The feeding-stuffs analysed included compound cakes, poultry meals, meat and bone meals, and silage.

A feeding cake was found to be below the guarantee in oil to the extent of 0.94 per cent. An unspecified feeding meal contained 10.03 per cent of fibre, which is a higher amount than is usual. The maximum amount of fibre, prescribed by the regulations of the Ministry of Food, for cattle, pig, and poultry feeds is 9 per cent, subject to the limit of variation prescribed by the Fertilisers and Feeding-Stuffs Act—namely, one-eighth of the amount guaranteed.

A sample of waste food meal (kitchen waste) was found to have the following composition: oil, 7.8 per cent; albuminoids, 13.6 per cent; soluble carbohydrates, 49.4 per cent; and fibre, 7 per cent. The mineral matter was high owing to the presence of 5.7 per cent of sandy material. This proportion is much higher than is usually present in ordinary feeding-stuffs. The price of kitchen waste is often about £19 per ton and, owing to prevailing conditions, it is a relatively expensive feeding-stuff.

Two samples of oat feed were widely different in composition. One of the samples contained 2.04 per cent of oil, 4.25 per cent of albuminoids, and 28.85 per cent of fibre, while the other sample contained 7.48 per cent of oil, 13.12 per cent of albuminoids, and 8.64 per cent of fibre.

A sample of meat and bone meal contained 12.44 per cent of oil, 55.38 per cent of albuminoids, and 7.62 per cent of phosphoric acid, while another contained 9.27 per cent of oil, 50.19 per cent of albuminoids, and 10.15 per cent of phosphoric acid.

The samples of poultry meal analysed were found to be of average composition.

The following table (Table II.) gives the results of analyses of the various feeding-stuffs analysed:—

TABLE II.

		Oil.	Albu- minoids.	Phos. acid.			
Meat and bone meal	. .	12.44	55.38	7.62	..	..	..
Meat and bone meal	. .	9.27	50.19	10.15	..	..	..
				Soluble carbo- hydrates.	Fibre.	Ash.	Moisture.
Feeding-stuff	. . . .	2.85	16.53	..	10.03	..	..
Feeding-stuff	. . . .	7.82	13.62	49.45	6.98	13.60	8.53
Feeding cake	. . . .	4.06	22.59	..	7.72	..	..
Oat feed	. . . .	7.48	13.12	57.76	8.64	3.74	9.26
Oat feed	. . . .	2.04	4.25	..	28.85	..	..
Layers' mash	. . . .	3.46	17.87	..	6.24	..	..
Growers' mash	. . . .	3.18	16.13	..	7.49	..	..
Silage	. . . .	0.50	1.02	7.09	6.63	1.09	83.67

MILKS.

Six samples of milk were analysed for the proportion of fat. The average proportion was very satisfactory, being 3.84 per cent. The proportions of fat varied from 3.50 to 4.25 per cent.

It may be of interest to members to note that in prosecutions alleging adulteration of milk by the addition of water, results of the freezing-point test, using the Hortvet technique, are now commonly accepted in the Courts. While this test is very reliable for the detection of added water in milk, it may also be a safeguard to the honest dairyman. It is well known that no insignificant proportion of cows yield milk in which the percentage of solids-not-fat falls below the presumptive standard of 8.5. When this happens it is presumed, "until the contrary is proved," that the milk is not genuine, and the onus of proof is on the seller. If the milk is genuine it will be found that, in spite of the low proportion of solids-not-fat, the freezing point is normal—that is, the freezing-point depression will not be less than 0.53° C. In this connection it should, perhaps, be pointed out that if souring has taken place the freezing-point test is less reliable, and if the souring has developed beyond a certain degree the test cannot be applied. It will, therefore, be obvious that if it is desired to have this test carried out the milk should be sent to the analyst as soon as possible, preferably in a special container cooled with ice.

WATERS.

The number of waters submitted for analysis during the year was much higher than is usual, sixty-two being examined, of which over one-half were found to be suitable for domestic use. Seven were of excellent or very good quality. Several samples were polluted by sewage, as indicated by high proportions of free ammonia often accompanied by nitrite. One sample had become

contaminated by paraffin oil. In a number of cases surface or drainage water had gained access to the supplies. A rotting wooden pump was responsible for pollution in one instance. Two samples were cloudy in appearance, due to finely divided clay in suspension, but were otherwise satisfactory and were reported to be suitable for domestic use when obtained clear. Gravel and sand filtration was recommended for some of the supplies, particularly where weather conditions were likely to affect quality.

One sample contained dissolved lead, while another contained dissolved copper to the extent of ten parts per million. Three samples required treatment to remove iron in solution. In waters passing through galvanised piping, distinct traces of iron, often with traces of zinc in addition, were found to be present. One water contained dissolved zinc to the extent of six parts per million, but no iron. Many of the waters were tested on piping, and, if the action on lead, zinc, or copper was likely to lead to trouble, asbestos piping was recommended. In most of these supplies the water was of a soft, acid nature. It has frequently been found that unsuitable piping has been used with this type of water, and much inconvenience could be avoided if particulars of the piping proposed to be installed were given with the sample. Tests would then be made in the laboratory.

The hardness of supplies was determined when requested or thought necessary, and several samples were examined bacteriologically.

POISONS.

Several examinations for poisons were made on the stomach contents of farm animals, feeding-stuffs, and materials picked up in fields.

The cause of death of two heifers was found to be lead. Red lead was identified in fragments in the stomach contents. In connection with the same case, material picked up in a field was found to be free from that compound of lead.

Two samples of paint, found in a field, contained lead, and were supposed to be the cause of death of a stirk.

A sample of powder, also found in a field, contained a high proportion of arsenic, and would have been very dangerous to live stock.

MISCELLANEOUS.

A boiler deposit, sent for analysis, was found to consist almost entirely of calcium carbonate with only a very small proportion of siliceous matter.

A sample of grain was examined for the presence of mercurial dressings. Special delicate tests for such dressings were applied and gave positive results.

Seed potatoes, which had been damaged during transit by rail, were found to be quite unfit for seed purposes. Wet packing, or dampness acquired on the journey, or defective ventilation, had caused heating and resulting decomposition.

SCOTTISH RED CROSS AGRICULTURE FUND.

SIXTH (AND FINAL) ANNUAL REPORT.

REPORT ON ACTIVITIES OF THE COMMITTEE OF THE FUND DURING THE YEAR 17TH APRIL 1945 TO 16TH APRIL 1946 SUBMITTED TO, AND ADOPTED BY, THE GENERAL COMMITTEE AT A MEETING HELD ON 19TH JUNE 1946.

THE General Committee decided, at their last Meeting on 20th July 1945, that the Appeal on behalf of the Fund should terminate, in conformity with the closure at 30th June of The Duke of Gloucester's Appeal. At the same time it was decided that, while the Appeal should be discontinued, the Fund would be kept open for some time longer for the purpose of ingathering various balances in the hands of the Area Committees, the proceeds of Victory Garden Shows which had been arranged, and the recovery of Income Tax receivable under Deeds of Covenant. The Fund was closed finally on 16th April 1946.

The results for the sixth year of operations, therefore, cannot be compared with those of the preceding years, when all activities were in operation. Nevertheless, the total amount of contributions received during the year was £13,506, 17s. 8d. To this was added a sum of £35, 3s. 6d., being interest accruing on sums placed on Deposit Receipt for short periods. This gave a total for the year of **£13,542, 1s. 2d.**

Adding that amount to the sums raised in the preceding five years—£115,876, 14s. 2d. in 1940-41; £109,839, 6s. 10d. in 1941-42; £151,949, 3s. 7d. in 1942-43; £171,438, 16s. 4d. in 1943-44; and £213,420, 19s. 7d. in 1944-45—gave a grand total for the six years during which the Fund was in operation of **£776,067, 1s. 8d.**

As in the preceding years, the money raised during the sixth year was handed over to the Scottish Branch, British Red Cross Society, and the St Andrew's Ambulance Association. The sum allocated to the former body was £12,871, 19s. 1d., and to the latter, £670, 2s. 1d.—in all, £13,542, 1s. 2d. The allocation, which was made by the Allocation Committee, was at the rate of 95 per cent to the Red Cross and 5 per cent to the St Andrew's Association. A sum of £139, 19s. 7d. was, however, excluded from the general allocation on account of the fact that it comprised sums specially earmarked by the donors for the Red Cross Society for parcels for Prisoners of War.

The expenses incurred in connection with the Fund during the final year amounted to a sum of £82, 10s. 9d., being mainly for

printing, stationery, and postages. These expenses were again defrayed by the Highland and Agricultural Society, which also provided the staff, office accommodation, telephone service, &c., free of charge. The Committee was, therefore, once more able to hand over every penny it received, plus Deposit Receipt interest, to the benefiting charities, without any deduction whatever for expenses.

Now that the Fund has finally closed, it is well to record that the total sum raised during the six years of the Committee's activities—£776,067, 1s. 8d.—surpassed all original expectations and hopes. Such a sum could not have been raised without great and sustained effort on the part of those responsible, over the whole period of the Fund's existence. Speaking at the Meeting of the General Committee, held on 20th July 1945, Lord Rosebery, then H.M. Secretary of State for Scotland, characterised the effort, at the end of the fifth year, as an "extraordinary performance." The final result shows to what extent the Red Cross Services occupied the minds of Scottish agriculturists, despite the heavy calls made upon them in other directions during the six long years of war. It is an achievement of which everyone in the agricultural community in Scotland can be proud.

During the six years the total sum handed over to the Scottish Branch, British Red Cross Society, was £715,088, 8s. 10d., and to the St Andrew's Ambulance Association £60,978, 12s. 10d.

The benefiting charities have repeatedly acknowledged the debt they owe to the Scottish Red Cross Agriculture Fund. It is interesting to note that in their Report for the year to 31st August 1945 the Scottish Branch of the British Red Cross Society state that the sum contributed by the Agriculture Fund up to 16th April 1945 represented 11·8 per cent of their war-time income.

AREA COMMITTEES.

As in previous years, the greater part of the sum raised during the year was provided by the Area Committees. In view of the intimation of the closure of the Fund most of the activities of the Committees were discontinued, and the sums received comprised, in the main, balances from previous efforts or the proceeds of functions which had been arranged before it was known that the Fund was to be closed. A notable exception, however, was the Tain Centre Committee, which, by a Voluntary Levy, Sports Day and Ploughing Match, was able to forward a sum of £2300. The total sum contributed by the Area Committees during the year was £7458, 4s. 8d., whilst the aggregate for the six years reached the impressive total of £690,187, 9s. 4d.

The subjoined list of Committees is arranged, as in previous Reports, under Highland Show Divisions. The amounts raised in each case during the final year and in the five preceding years are given, and also the total for the complete six years of the existence of the Fund.

ABERDEEN SHOW DIVISION.

<i>Aberdeenshire—</i>	<i>1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.</i>			Total.
Aberdeen	£2,647	6	3	
	2,159	14	8	
	3,120	3	6	
	5,000	0	0	
	4,170	0	0	
	305	0	0	
	<hr/>			£17,402 4 5
Alford	£788	19	2	
	805	6	11	
	<hr/>			
	510	12	6	
	1,038	13	9	
	<hr/>			3,143 12 4
Cromar and Upper Deeside . . .	£332	14	3	
	<hr/>			
	148	4	0	
	223	6	6	
	254	0	0	
	146	0	3	
	<hr/>			1,104 5 0
Ellon Area	(1940-41) £1,831	3	11	
	<hr/>			
	<i>1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.</i>			
Ellon	£847	9	6	
	1,020	2	7	
	1,198	10	4	
	1,501	10	2	
	3	0	0	
	<hr/>			£4,570 12 7
Foveran	£608	15	1	
	1,360	14	4	
	1,472	15	2	
	1,800	0	0	
	<hr/>			£5,242 4 7
Hatton	£1,025	3	1	
	1,051	5	0	
	1,298	10	0	
	1,451	0	0	
	5	4	0	
	<hr/>			£4,831 2 1
Carry forward . . .				£21,650 1 9

		Total.	
Brought forward . . .		£21,650	1 9
1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.			
Tarves	£1,500 0 0		
	2,006 0 0		
	3,010 0 0		
	5,000 0 0		
	71 14 1		
	£11,587 14 1		
Udny	£1,267 11 6		
	1,290 17 9		
	1,560 8 0		
	1,950 0 0		
	39 8 0		
	£6,108 5 3	34,171	2 6
1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.			
Insch	£1,435 8 4		
	1,264 10 1		
	935 0 0		
	2,600 0 0		
	3,000 0 0		
	83 13 6		
		9,318	11 11
Inverurie	£2,000 0 0		
	2,150 0 0		
	1,470 0 0		
	3,150 0 0		
	2,000 0 0		
	..		
		10,770	0 0
Maud	£1,506 10 0		
	2,500 0 0		
	187 12 6		
	16 10 10		
	2,791 0 0		
	425 19 2		
		7,427	12 6
Methlick	£500 0 0		
	550 0 0		
	1,550 0 0		
	2,250 0 0		
	328 16 2		
		5,178	16 2
Monymusk and Cluny	£1,000 0 0		
	..		
	1,085 14 0		
	..		
	..		
		2,085	14 0
Carry forward . . .		£90,601	18 10

		Total.
	Brought forward . . .	£90,601 18 10
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
Oldmeldrum . . . . .	..
	£258 0 0	
	350 0 0	
	..	
	..	
		608 0 0
Strathbogie (Huntly)	£1,241 0 0	
	1,744 2 2	
	1,782 16 6	
	2,230 0 0	
	2,685 0 0	
	..	
		9,682 18 8
Torphins	£338 12 1	
	..	
	..	
	744 13 5	
	..	
		1,083 5 6
Turriff	£1,400 0 0	
	2,031 19 10	
	1,870 19 6	
	4,676 6 6	
	6,377 2 4	
	115 1 3	
		16,471 9 5
<i>Banffshire—</i>		
Banff and Cornhill (Lower Banffshire)	£5,020 0 0	
	5,553 0 0	
	9,620 0 0	
	13,357 1 2	
	13,522 10 3	
	..	
		47,072 11 5
Dufftown	£548 5 8	
	..	
	..	
	39 7 5	
	..	
	..	
		587 13 1
Keith	£839 11 5	
	625 18 0	
	560 0 0	
	490 0 0	
	800 0 0	
	68 5 0	
		3,383 14 5
Carry forward . . .		£169,491 11 4

		Total.	
Brought forward . . .	£169,491	11	4
1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.			
<i>Kincardineshire—</i>			
Banchory	£522	18	0
	200	0	0
	657	11	6
	676	12	10
	35	7	9
South Kincardineshire (Laurencekirk)	£2,046	0	0
	2,419	11	6
	2,063	5	2
	4,002	19	3
	3,632	2	5
	64	11	3
Stonehaven	£866	4	2
	1,064	4	6
	1,381	12	9
	2,238	7	3
	2,615	7	11
	23	18	7
		8,189	15 2
		£194,002	6 2

BORDER SHOW DIVISION.

<i>Berwickshire—</i>			
Duns	£3,661	18	1
	4,288	14	6
	3,237	5	9
	2,528	16	3
	129	19	7
		£13,846	14 2
<i>Berwickshire and Roxburghshire—</i>			
St Boswells	£2,600	0	0
	2,400	0	0
	1,500	0	0
	2,100	0	0
	3,400	0	0
	97	7	3
		12,097	7 3
<i>Peeblesshire—</i>			
Peebles	£1,355	3	9
	2,765	12	0
	1,496	19	0
	740	0	0
	3,931	12	1
		10,289	6 10
Carry forward . . .		£36,233	8 3

		Total.
	Brought forward . . .	£36,233 8 3
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
<i>Roxburghshire—</i>		
Hawick	£200 0 0 289 0 0 250 0 0 .. 310 0 0 ..	
		1,049 0 0
Kelso and Jedforest	£3,274 17 9 2,822 12 3 3,162 19 7 2,951 8 4 2,373 13 7 5 10 0	
		14,591 1 6
Newcastleton	£182 16 2 177 15 0 233 7 0 331 0 0 412 0 0 ..	
		1,336 18 2
<i>Selkirkshire—</i>		
Selkirk	£555 7 0 587 6 5 344 0 0 340 0 0 1,006 0 0 15 0 6	
		2,847 13 11
		<u>£56,058 1 10</u>

DUMFRIES SHOW DIVISION.

<i>Dumfriesshire—</i>		
Annan	£590 6 2 753 8 0 1,676 2 9 2,720 16 6 750 0 0 832 4 8	
		£7,322 18 1
Dumfries	£650 0 0 600 0 0 700 0 0 3,069 1 0 1,850 0 0	
		6,869 1 0
Carry forward . . .		<u>£14,191 19 1</u>

		Total.
Brought forward	£14,191 19 1	
	<i>1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.</i>	
Langholm	£219 0 0	
	..	
	..	
	..	
	670 0 0	
	12 0 0	
	<hr/>	
Lockerbie	£773 15 9	901 0 0
	..	
	2,381 3 0	
	2,336 10 0	
	1,236 16 0	
	11 18 11	
	<hr/>	
Thornhill (Upper Nithsdale) . . .	£971 7 5	6,740 3 8
	1,117 19 11	
	2,000 0 0	
	2,700 17 2	
	3,000 0 0	
	..	
	<hr/>	
Kirkcudbrightshire—		9,790 4 6
Castle Douglas	£4,000 5 3	
	..	
	13,000 3 0	
	..	
	20,224 3 6	
	52 1 2	
	<hr/>	
		37,276 12 11
		<hr/>
		£68,900 0 2

EDINBURGH SHOW DIVISION.

<i>East Lothian—</i>		
Haddington	£3,109 5 2	
	2,780 10 8	
	2,723 1 1	
	2,328 18 11	
	1,738 9 3	
	96 15 0	
	<hr/>	
		£12,777 0 1
<i>Midlothian—</i>		
Dalkeith	£2,100 10 10	
	2,449 0 5	
	1,863 11 10	
	2,910 19 4	
	3,186 14 1	
	276 6 7	
	<hr/>	
		12,787 3 1
Carry forward . . .	£25,564 3 2	

		Total.
Brought forward . . .	£25,564	3 2
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
Edinburgh	£1,692 7 0	
	..	
	..	
	..	
	..	
	..	
	1,692 7 0	
Western Midlothian . . . . .	..
	..	
	£523 0 0	
	226 17 0	
	1,570 10 0	
	..	
	2,320 7 0	
West Lothian—		
Bathgate	(1941-42)	1,970 11 2
Linlithgow	£1,709 8 8	
	1,704 12 2	
	1,029 0 0	
	4,000 17 6	
	3,586 0 3	
	..	
	12,029 18 7	
	£43,577	6 11

GLASGOW SHOW DIVISION.

Argyll—		
Kilfinan and Tighnabruaich . . . . .	..
	£114 10 0	
	202 10 0	
	154 10 8	
	163 0 0	
	..	
	£634 10 8	
Lorn	(1945-46)	142 15 6
Mid-Argyll . . . . .	..
	..	
	£150 0 0	
	300 0 0	
	270 0 0	
	..	
	720 0 0	
Ayrshire—		
Ayr (South Ayrshire)	£4,000 0 0	
	25 0 0	
	3,600 0 0	
	..	
	7,625 0 0	
Carry forward . . .	£9,122	6 2

		Total.
Brought forward . . .		£9,122 6 2
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
Kilmarnock (North Ayrshire) . . . (1940-41)		550 0 0
<i>Buteshire—</i>		
Arran (1944-45)		795 0 0
<i>Lanarkshire—</i>		
Biggar £2,017 10 0		
	..	
	1,570 6 8	
	..	
	2,907 5 3	
	..	
	<hr/>	
		6,495 1 11
Lanark £4,009 13 9		
	3,636 1 8	
	6 19 6	
	..	
	21 0 0	
	318 6 4	
	<hr/>	
		7,992 1 3
Strathaven (1940-41)		750 0 0
Wishaw £1,357 19 0		
	..	
	1,034 6 0	
	..	
	..	
	50 2 6	
	<hr/>	
		2,442 7 6
<i>Renfrewshire—</i>		
Paisley (1942-43)		2,000 0 0
		<hr/>
		£30,146 16 10

INVERNESS SHOW DIVISION.

<i>Inverness-shire—</i>		
Inverness £590 5 6		
	1,903 11 4	
	1,511 8 8	
	1,446 11 11	
	1,039 14 9	
	97 7 0	
	<hr/>	
		£6,588 19 2
<i>Moray—</i>		
Elgin, Forres, Knockando and Elchies		
	..	
	£3,505 9 8	
	3,475 4 9	
	1,945 13 8	
	3,398 6 1	
	82 9 2	
	<hr/>	
		12,407 3 4
Carry forward . . .		£18,996 2 6

		Total.
	Brought forward .	£18,996 2 6
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
<i>Nairnshire—</i>		
Nairn . . . . .	..
	£1,130 0 0	
	1,300 0 0	
	60 13 4	
	14 2 8	
	<hr/>	2,504 16 0
<i>Ross-shire—</i>		
Dingwall	£3,968 14 6	
	..	
	10,613 1 9	
	..	
	17,967 7 4	
	6 10 0	
	<hr/>	32,555 13 7
Tain	£1,211 17 6	
	..	
	4,886 18 8	
	..	
	..	
	2,300 0 0	
	<hr/>	8,398 16 2
<i>Sutherland—</i>		
Dornoch	£1,110 0 0	
	1,060 0 0	
	1,166 6 11	
	1,251 2 1	
	1,223 0 0	
	6 6 0	
	<hr/>	5,816 15 0
		<hr/>
		£68,272 3 3

PERTH SHOW DIVISION.

<i>Fife—</i>		
Anstruther	£1,465 0 0	
	1,627 2 0	
	1,630 0 0	
	3,500 0 0	
	3,000 0 0	
	..	
	<hr/>	£11,222 2 0
Cupar	£2,007 7 11	
	2,678 8 3	
	2,642 13 2	
	3,000 0 0	
	1,920 0 0	
	491 14 9	
	<hr/>	12,740 4 1
	Carry forward . . .	£23,962 6 1

		Total.
	Brought forward	£23,962 6 1
	1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	
Dunfermline	£1,770 14 8	
	2,056 8 7	
	1,077 0 0	
	2,686 6 8	
	2,543 10 8	
	108 0 0	
	<hr/>	10,242 0 7
Thornton	£2,000 0 0	
	2,300 0 0	
	2,100 0 0	
	2,100 0 0	
	1,500 0 0	
	87 7 10	
	<hr/>	10,087 7 10
<i>Kinross-shire—</i>		
	£1,270 0 4	
	1,550 0 0	
	1,220 0 0	
	1,500 9 6	
	2,950 4 11	
	1 0 0	
	<hr/>	8,491 14 9
<i>Perthshire—</i>		
Aberfeldy	£1,606 3 7	
	2,597 13 2	
	4,474 7 6	
	<hr/>	8,678 4 3
Blairgowrie	£2,127 10 4	
	3,402 0 0	
	4,015 12 5	
	7,000 0 0	
	4,150 0 0	
	99 1 0	
	<hr/>	20,794 3 9
Perth	£4,801 3 8	
	5,278 19 11	
	6,467 8 9	
	9,090 0 0	
	10,606 8 7	
	<hr/>	36,244 0 11
Pitlochry	£620 0 0	
	696 16 4	
	385 13 10	
	431 16 10	
	263 15 8	
	79 1 6	
	<hr/>	2,477 4 2
		<hr/>
		£120,977 2 4

STIRLING SHOW DIVISION.

		1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.	Total.
<i>Perthshire—</i>			
Crieff, &c. (Strathearn)		£2,031 11 10	
		2,014 8 9	
		1,647 2 5	
		190 13 0	
		217 9 6	
		57 10 0	
		<hr/>	£6,158 15 6
<i>Stirlingshire—</i>			
Drymen	(1940-41)		371 10 0
Falkirk		£2,373 11 4	
		2,129 18 0	
		1,034 18 3	
		2,162 9 11	
		1,729 18 3	
		3 15 0	
		<hr/>	9,434 10 9
Stirling		£5,013 0 0	
		4,610 0 0	
		3,200 0 0	
		3,750 0 0	
		..	
		..	
		<hr/>	16,573 0 0
			<hr/>
			£32,537 16 3

COUNTY OF ANGUS.

Arbroath		£2,309 7 0	
		2,763 7 3	
		2,529 2 1	
		1,822 19 7	
		3,230 10 8	
		2 10 0	
		<hr/>	£12,657 16 7
Brechin		£1,600 0 0	
		3,437 3 5	
		3,446 15 1	
		3,730 19 11	
		4,200 3 5	
		206 3 10	
		<hr/>	16,621 5 8
Dundee		£2,003 3 0	
		2,488 2 0	
		2,031 0 0	
		970 0 0	
		2,597 12 6	
		58 18 11	
		<hr/>	10,148 16 5
Carry forward			£39,427 18 8

		Total.
	Brought forward . . .	£39,427 18 8
	<i>1940-41, 1941-42, 1942-43, 1943-44, 1944-45, and 1945-46.</i>	
Forfar	£3,500 0 0	
	3,951 0 0	
	3,670 0 0	
	3,955 0 0	
	3,050 0 0	
	..	
	<hr/>	18,126 0 0
Montrose	£2,319 18 4	
	3,026 6 9	
	2,284 10 0	
	5,035 8 8	
	5,495 13 2	
	..	
	<hr/>	18,161 16 11
		<hr/>
		£75,715 15 7
		<hr/>

[ABSTRACT

ABSTRACT.

Division.	1940-41.		1941-42.		1942-43.		1943-44.		1944-45.		1945-46.		Total.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Aberdeen .	23,364	13 3	29,267	6 10	31,334	5 1	50,060	8 11	58,259	13 1	1,715	19 0	194,002	6 2
Border .	11,830	2 9	9,042	5 8	11,276	0 1	9,699	14 1	13,962	1 11	247	17 4	56,058	1 10
Dumfries .	7,204	14 7	2,471	7 11	19,757	8 9	10,827	4 8	27,730	19 6	908	4 9	68,900	0 2
Edinburgh .	8,611	11 8	8,904	14 5	6,138	12 11	9,467	12 9	10,081	13 7	373	1 7	43,577	6 11
Glasgow .	12,635	2 9	3,775	11 8	8,564	2 2	454	10 8	4,156	5 3	511	4 4	30,146	16 10
Inverness .	6,880	17 6	6,469	1 0	22,783	0 9	5,943	7 8	23,689	1 6	2,506	14 10	68,272	3 3
Perth .	17,668	0 6	19,589	15 1	22,136	1 4	29,308	13 0	31,408	7 4	866	5 1	120,977	2 4
Stirling .	9,789	13 2	8,754	6 9	5,882	0 8	6,103	2 11	1,947	7 9	61	5 0	32,537	16 3
County of Angus	11,732	8 4	15,665	19 5	13,961	7 2	15,514	8 2	18,573	19 9	267	12 9	75,715	15 7
Totals .	109,767	4 6	103,940	8 9	141,832	18 11	137,379	2 10	189,809	9 8	7,458	4 8	690,187	9 4

In preceding Annual Reports due tribute has been paid to the work of the Area Committees. In this final Report it is difficult to find further adequate words in which to express what the efforts of these Committees have meant to the Fund. Perhaps the best tribute is to let the figures speak for themselves. Out of the final grand total of £776,067, 1s. 8d. no less than £690,187, 9s. 4d. was contributed by the Area Committees. Only those connected with the Fund can realise the immense activity and work of the Area Committees and their Executives and officials over the whole period of their operations. The unbounded thanks of the General Committee are therefore warmly expressed for the splendid service rendered by the Area Committees, and for the unstinted generosity on the part of their supporters and contributors.

The yearly achievements of these Committees have been set out in previous Annual Reports, and it is therefore of interest to record in the undernoted list the aggregate of contributions reached by various Committees over the whole period of their activities:—

Lower Banffshire Area Committee	£47,073
Stewartry (Castle Douglas) Committee	37,277
Perth Local Committee	36,244
Ellon Area Committee	34,171
Dingwall Centre Committee	32,556
Blairstown Centre Committee	20,794
Montrose Area Committee	18,162
Forfar Area Committee	18,126
Aberdeen Area Committee	17,402
Brechin and District Committee	16,621
Stirling Centre Committee	16,573
Turriff Area Committee	16,471

By consistent enterprise and effort throughout the past six years the Lower Banffshire Area Committee has deservedly earned the right to first place by its weight of contribution. From the inauguration of the Fund until the intimation of the closure that Committee was untiring in its efforts on behalf of the Fund. Their outstanding achievement is one of which the members of the Committee may well be proud.

Following this premier achievement two notable contributions of £13,000 and £20,224, in 1942 and 1944 respectively, gave the Stewartry Committee at Castle Douglas second place. The magnificent sum of £20,224 raised in 1944 still remains a record for any single centre in Scotland.

Perth Local Committee, Ellon Area Committee, and Dingwall Centre Committee were outstanding in the extent of their contribution and follow in that order, although, in actual amounts raised, very little separates them. Further mention must here be made of the notable effort by the Dingwall Committee in 1944, which raised the remarkable sum of £17,967. In singling out these Committees for special mention it is not intended to overlook the praiseworthy efforts of other Committees which have each and all justly earned the grateful thanks and appreciation of the General Committee for valued, constant, and substantial support.

In the foregoing list the sums contributed by the Area Committees have been allocated to their respective counties. It should be noted that these figures relate only to sums received from the Area Committees, and that they do not include other contributions sent in from these counties, such as the proceeds of Victory Garden Shows, Dances, &c. It may also be mentioned that an Area Committee may have operated from a centre so near the boundary that its area of activity extended into a neighbouring county. While the figures given, therefore, represent the allocation to the respective counties, the figures must not be taken as a complete and exhaustive record of the total effort of any county on behalf of the Fund.

It will be seen from the foregoing list that, in the aggregate totals for the six years, Aberdeenshire occupies the premier place with a wonderful contribution of £118,447, 12s. 5d., representing over 17 per cent of the total contributions by the Area Committees. Perthshire comes next in order with a grand total of £80,031, 8s. 7d., closely followed by Angus, which contributed £75,715, 15s. 7d.

VICTORY LAMPS.

In 1944 the Committee of the Red Cross Agriculture Fund in England presented to this Fund six replicas of the Florence Nightingale Lamp. These replicas were awarded to the Dingwall, Ellon, Lower Banffshire, Perth, Stewartry (Castle Douglas), and Stirling Committees in recognition of their signal efforts in aid of this Fund during the first three years.

During the year under review, through the generosity of the Chairman's Committee of the English Fund, a further four replicas were made available to the Scottish Fund. It was decided that these should be presented to the Area Committees (excluding the Committees previously honoured) which had raised the largest sums during the period of the Fund. These replicas have accordingly been awarded to the Aberdeen, Blairgowrie, Forfar, and Montrose Committees in recognition of the splendid work done by these Committees.

The Chairman's Committee of the Red Cross Agriculture Fund in England also presented to the Highland and Agricultural Society of Scotland a Victory Lamp in recognition of the valuable services rendered by that Society to the Fund.

VICTORY GARDEN SHOWS.

Many of the Shows and Sales had been arranged for Season 1945 before it was known that the Fund was to be closed, and these were proceeded with, in most cases, according to plan. In view of the closure of the Red Cross Fund a few Societies transferred their support to the "Welcome Home" Funds. Nevertheless, a total of £2926, 13s. 4d. was received during the year. While that return, as had been expected, was far short of the record sum of £3271, 12s. contributed in 1944, it proved that the enthusiasm of

the Garden and Allotment Societies had not diminished. The grateful thanks of the General Committee are therefore due to the various Associations and Societies who were responsible for contributing more than one-fifth of the total sum received by the Fund during the year under review.

The leading returns for Season 1945 are given in the following list :—

Ballantrae (Ayrshire) . . .	£379	Oban (Argyll) . . .	£200
Leven (Fife) . . .	300	Balloch (Dumbartonshire) .	186
Burnside Wardens (Glasgow)	268	Longcroft (Stirlingshire) .	127
Parkhead and Sighthill (Edinburgh) . . .	250	Scottish Dyes Recreation Club, Grangemouth . . .	108
Whitburn W.R.I. (West Lothian) . . .	208		

As in 1944, the Ballantrae Victory Garden Show Committee headed the list with a third and splendid contribution of £379. That result reflected the enthusiasm and energy with which the members of that Committee continued to support the cause. The Ballantrae Committee takes the lead both in single contribution (in Season 1944, £966), and also in aggregate contribution—having raised no less than £1695 during past seasons. The Leven and District Gardens and Allotments Association continued to accord its weighty support by a further contribution of £300, as also the Burnside Wardens (Glasgow) with a contribution of £268. Parkhead and Sighthill Horticultural Society (Edinburgh) well maintained its support by a donation of £250. Departing from their usual activities the members of Whitburn Women's Rural Institute staged a successful Flower Show, which, along with the proceeds of a Dance, resulted in a most welcome addition of £208 to the Fund. Oban and District Committee, with unfailing regularity, sent in a further handsome contribution of £200.

It is not possible, owing to limitations of space, to comment on the many other welcome contributions. The Societies and Associations which have not been specially mentioned have no reason to feel that their efforts have not been appreciated. On the contrary, the list of contributions shows that all Societies, both large and small, worked with a firm resolve in their endeavour to benefit the Red Cross Agriculture Fund.

The Victory Garden Shows and Sales, which started in Season 1941, have contributed no less than £25,064, 18s. 8d. during the period of the Fund. The following list gives the yearly returns :—

Season 1941	£1,914	16	1
Season 1942	3,888	15	7
Season 1943	7,944	7	8
Season 1944	8,271	12	0
Season 1945	2,926	13	4

£24,946 4 8

Various sums contributed in 1940

118 14 0

£25,064 18 8

This is a remarkable achievement by the horticulture lovers, and has formed a worthy contribution to the Fund. Commencing in 1941 with a modest total of over £1900 these Shows and Sales gained in number and amount of contribution each successive year until in 1944 over £8271 was realised. The final result is evidence of the generous support of the various Associations and Societies which is gratefully acknowledged by the General Committee.

The following list, showing the leading aggregate contributions sent in during past seasons, is proof of sustained and successful effort by all associated with the Victory Garden Shows :—

Ballantrae (Ayrshire) . . .	£1695	Burnside Wardens (Glasgow) .	£767
Leven (Fife) . . .	1120	Hillington (Renfrewshire) .	590
Carmyle (Glasgow) . . .	1100	Balloch (Dumbartonshire) .	580
Royal Caledonian Horticultural Society (Edinburgh) .	1090	Haddington (East Lothian) .	547
Bonnybridge (Stirlingshire) .	1071	Bishopshire (Kinross-shire) .	504
Longcroft (Stirlingshire) .	1029	Dalmellington (Ayrshire) .	502
Kirkcaldy (Fife) . . .	993	Kennoway (Fife) . . .	479
Oban (Argyll) . . .	938	Inverurie (Aberdeenshire) .	444
Whitburn (West Lothian) .	777	Bridge of Allan (Stirlingshire) .	441
Parkhead and Sighthill (Edinburgh)	768	Newlands (Glasgow) . . .	415
		Chirnside (Berwickshire) .	404

FARM WORKERS' CONTRIBUTIONS.

During the past year a total of **£274, 12s. 5d.** was received on account of contributions by Farm Workers. This sum, however, does not give a true indication of the support accorded to the Red Cross by Farm Workers in Scotland. Many workers have been associated with existing Penny-a-Week and other schemes in their localities, and they have, in addition to these contributions, given valuable support to the Area Committees.

As in previous years Farm Workers in East Lothian contributed a substantial part of the total, the Haddington Centre Committee forwarding no less than £149, 4s. 4d. Other centres sending in these welcome contributions included Ayr, Dalkeith, Duns, Kelso, and Tain.

The grand total of Penny-a-Week contributions to the Fund amounted to £1860, 5s. 6d.

To all contributors, as well as to those officials who kindly undertook the collection and forwarding of the contributions, the Committee of the Fund extends its grateful thanks.

OTHER CONTRIBUTIONS.

Other contributions, while not as numerous as in previous years, nevertheless totalled **£2847, 7s. 3d.** A notable contribution of £678 was received from the East Kilbride and District Young Farmers' Club and the East Kilbride Open Cattle Show Society.

Wigtown Agricultural Society made a worthy donation of £100 from the proceeds of its Annual Show. The Haddington Horse Parade Committee again organised a successful Parade in 1945 and forwarded a welcome donation of £136 out of the proceeds. The Agricultural Societies and Young Farmers' Clubs and other organisations promoted many functions, including Whist Drives, Dances, and Dramatic Entertainments, and the Fund benefited by £284 as a result of these efforts. The support of these Societies and Clubs is greatly appreciated. Of others whose endeavours have resulted in substantial contributions mention may be made of the Mearns Agricultural Society, £75 ; staff of the South Ayrshire Agricultural Executive Committee, £67 ; and East Stirlingshire Young Farmers' Club, £30.

A handsome donation of £161 was made by the Oxenfoord Home Farm Committee, which again arranged Sheep Dog Trials and a Fete at Oxenfoord Castle.

The registered milk producers of the Aberdeen Milk Marketing Board, under their scheme for periodical contributions, forwarded a worthy final contribution of £235 during the year.

Once again the Committee are pleased to acknowledge a very welcome contribution of £121 from the personnel of H.M.S. *Jackdaw* (Royal Naval Air Station, Crail). Throughout the period of the Fund there have been no more staunch supporters of the Fund than the Officers, Petty Officers, Ratings, and Wrens of the station.

The staff of the Edinburgh and East of Scotland College of Agriculture continued their generous support, and their donations for the year amounted to £42.

The generous spirit of the boys of Loretto School, Musselburgh, resulted in a gift of £10, 10s. to the Fund. The boys once again made over the amount of their earnings for their seasonal work in local Market Gardens.

In this limited review it is not possible to refer to all the donations which have been received throughout the year. To all donors, however, who have contributed in their several ways, the Committee of the Fund is sincerely grateful for their generosity and for their practical support.

ACKNOWLEDGMENTS.

The final figures for the Fund have fully justified the belief of the originators of the Fund that an appeal to the Agricultural Community on behalf of the Red Cross and the St Andrew's Ambulance Association would not go unanswered. As has been stated, the sum realised has greatly exceeded the most optimistic hopes of the General Committee. The members of the Committee are fully aware that no amount of direction or organisation on their part could have been responsible for the raising of such a magnificent sum if the Area Committees had not been so enthusiastic and hard-working and the response from the contributors so whole-hearted. It can be truly stated that the outstanding success of the

Fund was due to the Area Committees. Associated with them in their splendid work were numerous other organisations. The Women's Rural Institutes and other Women's Associations most willingly co-operated. Young Farmers' Clubs infused youthful vigour into the various schemes for raising funds. Nor must the urban population be forgotten. Working side by side with their rural neighbours, the townspeople, ably led by the civic heads, who in many cases acted as Conveners of Committees, rendered valuable help. To the Area Committees, their Conveners, Members, Secretaries and Treasurers, and all associated with them in their magnificent efforts over the past six years, the Committee of the Fund owes a special debt of gratitude.

Special mention has every year been made of the services of the Live Stock Auctioneers. Without their whole-hearted co-operation the wonderful success of the Free Gift Sales which benefited the Fund so much would not have been possible. The Auctioneers freely gave of their services, the services of their staffs and the use of their premises, and worked with untiring effort to make these ventures outstandingly successful. Not only did they give their services at the Sales, but in many cases they took active part in the work of the Area Committees. Much of the arduous secretarial work was done by their staffs, who spared no effort in their endeavour to further the success of the Area Committees' operations. The General Committee of this Fund wishes to place on record its warm appreciation of the indispensable help rendered by the Auctioneers and their staffs.

Grateful acknowledgment is made of the valuable help and co-operation extended to the Committee by the Directors and Members of the Highland and Agricultural Society of Scotland and by the Council, Members, and Officials of the National Farmers' Union and Chamber of Agriculture of Scotland. As stated in previous Reports, representatives of these bodies, and of the County and District Agricultural Societies throughout the country, formed the backbone of the Area Committees. The local branches of the N.F.U. and Chamber provided, in many cases, a ready-made basis for the Area Committees or simply assumed the duties of such Committees. In other areas these arduous duties were undertaken by the County and District Agricultural Societies. To these bodies and to their hard-working Office-bearers and Officials the Committee extends its most cordial and grateful thanks.

The thanks of the Committee to Horticultural Societies and Allotment Associations, to Farm Workers, and to various other Societies and Associations have been expressed in the preceding sections of this Report dealing with these matters.

Throughout the past six years various commercial interests and Breed Societies rendered great service on behalf of the Fund. Their support and interest is also gratefully acknowledged.

From the institution of the Fund the Scottish Press gave valuable publicity to the activities and progress of the Fund. Both agricultural and daily newspapers gave prominence to news and items of interest regarding its progress. Without that assist-

ance the Committee would have been much handicapped in its efforts, and it has pleasure in recording its sense of gratitude to the newspapers concerned.

The thanks of the Committee are also due to the Royal Bank of Scotland, which, throughout the continuance of the Fund, has waived all charges on cheques passing through the Bank.

At the termination of a most successful scheme the General Committee desires to express its most cordial thanks and appreciation to all those who contributed so generously to the Fund throughout the past six years. By their support the benefiting charities have been greatly assisted in carrying out their mission so necessary in time of war.

RED CROSS AGRICULTURE FUND IN ENGLAND.

Up till the close of the Fund the Committee continued to work in the closest co-operation with the Red Cross Agriculture Fund in England. Throughout the whole period the relations between the two Committees were of a most cordial nature. The efforts of the English Committee were of a comprehensive nature and organised on an extensive scale. Through efficient organisation and wholehearted enthusiasm that Committee succeeded in raising the wonderful total of £7,388,188: Some of the schemes, which had no counterpart in our Scottish organisation, such as the "Dogs of Britain" and "Racing Pigeons" Appeals, attracted contributions from Scotland. These were duly handed over to the Scottish Fund, and during the past year a sum of £1040, 15s. 3d. was received in this way.

Through the courtesy of the Chairman of the Committee, Mr R. W. Haddon, C.B.E., and the Secretary, Mr Alec D. Robertson, all information at the disposal of the Committee was made available to the Scottish Committee. All requests for information or guidance were attended to with unfailing courtesy and promptitude. The help of the English Committee and of its able Secretary, Mr Robertson, was of inestimable value to the Scottish Fund, and is hereby most gratefully acknowledged.

JOHN STIRTON,

Hon. Secretary and Treasurer.

8 EGLINTON CRESCENT,
EDINBURGH 12, 12th June 1946.

ABSTRACT OF RECEIPTS AND PAYMENTS BY THE HON. SECRETARY
AND TREASURER FOR THE SIXTH FINANCIAL YEAR, 17TH APRIL 1945
TO 16TH APRIL 1946.

Receipts.

1. Sums raised by Area or Centre Committees, being mainly balances from the proceeds of the Free Gift Sales, Voluntary Levies or Assessments, and Collections of 1944-45	£7,458	4	8
2. Victory Garden Shows—Proceeds of Shows and Sales held by Horticultural and Allotment Societies, also Donations, &c.—Season 1945	2,926	13	4
3. Contributions from Farm Workers (Penny-a-Week Scheme)	274	12	5
4. Agricultural and Allied Bodies—			
(1) Donations, &c.	£954	13	3
(2) Proceeds of Whist Drives and Dances, &c.	284	4	2
	1,238	17	5
5. Agricultural and Commercial Interests—Donations, &c.	873	1	0
6. Unclassified Contributions	735	8	10
	£13,506	17	8
7. Interest on sums placed on Deposit Receipt for short periods	35	3	6
	£13,542	1	2

Payments.

1. Expenses of Administration—			
(1) Postages	£12	0	0
(2) Stationery, &c.	19	5	0
(3) Printing, &c.	46	13	9
(4) Miscellaneous Payments	4	12	0
Total	£82	10	9
Received from the Highland and Agricultural Society of Scotland to defray expenses	82	10	9
2. Payments to benefiting Charities—			
(1) Scottish Branch, British Red Cross Society	£12,871	19	1
(2) St Andrew's Ambulance Association	670	2	1
	£13,542	1	2
	£13,542	1	2

EDINBURGH, 31st May 1946.—I have examined the Books and Accounts of the Treasurer of THE SCOTTISH RED CROSS AGRICULTURE FUND COMMITTEE, of which the foregoing is an Abstract, and have found the same to be correctly stated and sufficiently vouched and instructed.

GEO. JAMES GREGOR, C.A., *Hon. Auditor.*

ABSTRACT OF RECEIPTS AND PAYMENTS FOR THE
WHOLE PERIOD OF THE FUND.

(17th April 1940 to 16th April 1946.)

Receipts.

1. Sums raised by Area or Centre Committees, being the proceeds of Free Gift Sales, Voluntary Levies or Assessments, Collections, &c.	£690,187	9	4
2. Victory Garden Shows—Proceeds of Shows and Sales held by Horticultural and Allotment Societies	25,064	18	8
3. Contributions from Farm Workers (Penny-a-Week Scheme)	1,860	5	6
4. Agricultural and Allied Bodies—Donations, Proceeds of Whist Drives and Dances, &c.	10,084	15	0
5. Agricultural and Commercial Interests—Donations, &c.	21,053	17	8
6. Grants from County War Funds	3,550	0	0
7. Scottish Breed Societies—Donations by Members	14,111	11	5
8. Unclassified Contributions	9,584	7	4
	<hr/>		
	£775,497	4	11
9. Deposit Receipt Interest	569	16	9
	<hr/>		
	£776,067	1	8

Payments.

1. Expenses of Administration (Stationery, Printing, Postages, &c.)—defrayed by the Highland and Agricultural Society of Scotland	£852	19	4
2. Payments to benefiting Charities—			
Scottish Branch, British Red Cross Society	£715,088	8	10
St Andrew's Ambulance Association	60,978	12	10
	<hr/>		
	£776,067	1	8

List of Conveners and Secretaries, &c., of the Area Committees

Centre.	
ABERDEEN	<i>Convener</i> —Lord Provost Sir Thomas G. Mitchell, Aberdeen. <i>Hon. Secretary</i> —Robert C. May, Advocate, 77 Crown Street, Aberdeen.
ABERFELDY	<i>Convener</i> —Provost J. D. Haggart, O.B.E., Aberfeldy. <i>Hon. Secretary</i> —R. J. Cameron, Bank of Scotland, Aberfeldy.
ALFORD	<i>Convener</i> —Alexander Philip, Woster Fowlis, Leochel-Cushnie. <i>Joint Hon. Secretaries and Treasurers</i> —W. A. P. Cormack, Norwood, Alford; W. A. Lawson, Scotsmill, Tullynessle, Alford.
ANNAN	<i>Convener</i> —..... <i>Vice-Convener</i> —Andrew R. Semple, Charlesfield, Annan. <i>Hon. Secretary</i> —Alec Knox, Solicitor, British Linen Bank, Annan.
ANSTRUTHER	<i>Convener</i> —Andrew S. Burns, Broomlees, Kileonquhar, Fife. <i>Hon. Secretary</i> —J. Gordon Dow, Solicitor, Anstruther.
ARBROATH	<i>Joint Conveners</i> —H. W. Dodds (Scott & Graham Ltd.), Arbroath; Percy E. Morgan, Windyhills, Arbroath. <i>Hon. Secretary</i> —Mrs J. B. Meikle, 1 Golf Avenue, Monifieth. <i>Hon. Treasurer</i> —W. Stark, British Linen Bank, Arbroath.
ARRAN	<i>Correspondent</i> —H. S. M'Nicol, Royal Bank of Scotland, Brodick.
AYR (South Ayrshire).	<i>Convener</i> —General Sir Charles Fergusson, G.C.B., G.C.M.G., D.S.O., &c., of Kilkerran, Bt., Maybole. <i>Hon. Secretary</i> —Hugh Bone, 1 Racecourse Road, Ayr.
BANCHORY	<i>Convener</i> —G. Davidson, Nether Balfour, Durris, Drumoak. <i>Hon. Secretary</i> —David Humble, The Ley, Banchory.
BANFF & CORNHILL (Lower Banffshire).	<i>Joint Conveners</i> —Provost John C. H. Addison, Banff; James A. Davidson, Culbucuhly, Banff. <i>Hon. Secretary</i> —James M. Simpson, M.A., LL.B., Solicitor, Banff.
BIGGAR	<i>Convener</i> —Robin G. Murray, Spittal, Biggar. <i>Hon. Secretary</i> —James Noble, Gowanlea, Symington, Biggar. <i>Hon. Treasurer</i> —Alexander Foster, National Bank of Scotland, Biggar.
BLAIRGOWRIE	<i>Convener</i> —Rev. A. Wylie Smith, The Manse, Bendochy, Coupar Angus. <i>Hon. Secretary</i> —William Inverarity, C.A., Blairgowrie.
BRECHIN	<i>Joint Conveners</i> —W. Arnot, Fithie, Brechin; W. D. Mackenzie (The Farmers' Mart Ltd.), Brechin. <i>Hon. Secretary</i> —George White, Brechin.
CASTLE-DOUGLAS	<i>Chairman</i> —R. G. D. Thomas of Southwick, Dumfries. <i>Hon. Secretary and Treasurer</i> —Richard J. Singer, F.I.A.(Scot.) (Wallets' Marts Ltd.), Castle-Douglas.
CLUNY, &C.	<i>Conveners</i> —Lady Grant of Monymusk; Mrs Claeson Gordon of Cluny, Cluny Castle, Cluny. <i>Joint Hon. Secretaries</i> —H. R. Mollison, J.P., Cluny Estates Office, Aberdeen; A. W. M. Whiteley, The Schoolhouse, Monymusk. <i>Hon. Treasurer</i> —J. Milton, J.P., Bank House, Sauchen.
CRIEFF, &C. (Strathearn).	<i>Joint Conveners</i> —Sir J. Denby Roberts, Bt., Strathallan Castle, Auchterarder; Duncan M. Stewart of Millhills, Crieff. <i>Hon. Secretary</i> —John D. S. Miller, M.A., B.L., 14 Comrie Street, Crieff.
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THE CEREAL AND OTHER CROPS OF SCOTLAND FOR 1945.

THE following comparison of the cereal and other crops of 1945 with those of the previous year has been prepared by the Secretary of the Society from answers to queries sent to leading agriculturists in different parts of the country.

The queries issued by the Secretary were in the following terms :—

1. What was the quantity, per imperial acre, and quality of grain and straw as compared with last year, of the following crops ? The quantity of each crop to be stated in bushels or cwts. What quantity of seed is generally sown per acre ?—(1) Wheat, (2) Barley, (3) Oats.
2. Did the harvest begin at the usual time, or did it begin before or after the usual time ? and if so, how long ?
3. What was the quantity, per imperial acre, and quality of the hay crop, as compared with last year, both as regards ryegrass and clover respectively ? The quantity to be stated in tons and cwts.
4. Was the meadow hay crop more or less productive than last year ?
5. What was the yield of the potato crop, per imperial acre, as compared with last year ? The quantity to be stated in tons and cwts. Was there any disease ? and if so, to what extent, and when did it commence ? Were any new varieties planted, and with what result ?
6. What was the weight of the turnip crop, per imperial acre, and the quality, as compared with last year ? The weight of the turnip crop to be stated in tons and cwts. How did the crop braird ? Was more than one sowing required ? and why ?
7. Were the crops injured by insects ? State the kinds of insects. Was the damage greater or less than usual ?
8. Were the crops injured by weeds ? State the kinds of weeds. Was the damage greater or less than usual ?
9. Were the pastures during the season of average growth and quality with last year ?
10. How did stock thrive on them ?
11. Have cattle and sheep been free from disease ?
12. What was the quality of the clip of wool, and was it over or under the average ?

From the answers received, the following notes and statistics have been compiled:—

EDINBURGH DISTRICT.

MID-LOTHIAN. *Wheat*—A good average crop of 44 bushels per acre; well secured and of excellent quality; seed sown, $3\frac{1}{2}$ bushels per acre. *Barley*—48 bushels per acre; quality very good; seed sown, $3\frac{1}{2}$ bushels per acre. *Oats*—60 bushels per acre; a heavy crop, well secured except in the higher districts, where a spell of bad weather in October proved troublesome; seed sown, 5 bushels per acre. *Harvest*—A good harvest about the usual time; most of the grain secured in first-class condition. *Hay*—Italian ryegrass average, 2 tons 5 cwt. per acre; quality excellent, in marked contrast to last year's, mostly ruined by rain. *Meadow Hay*—About the same as last year in quantity; quality infinitely better. *Potatoes*—An excellent crop; 9 tons per acre; a little blight observed on shaws in September, but weather so dry that no damage was traced in tubers. *Turnips*—18 tons per acre; good average crop; no second sowing required, but brairds were irregular in coming to the hoe, especially those late sown. *Insects*—Green-fly appeared in August, but the damage was small; certain amount of loss caused in turnips by stem weevil. *Weeds*—Injury much the same as usual; in some cases too many white crops in succession allowing weeds to increase. *Pastures*—Grass was later in coming away owing to cold weather; from July onwards it was abundant, of excellent quality, and grazed on considerably later than usual. *Live Stock*—Did very well indeed; cattle and sheep generally were free from disease. *Clip of Wool*—Quantity under average; still far too much damage by injurious colouring matter.

EAST LOTHIAN (Upper). *Wheat*—48 to 56 bushels per acre; straw 30 cwt. per acre; quality excellent; much better than previous year; seed sown, 4 bushels per acre. *Barley*—50 to 60 bushels per acre; straw 25 cwt. per acre; quality of both very good; much better than previous year; seed sown, 3 bushels per acre. *Oats*—72 to 88 bushels per acre; straw 25 cwt. per acre; quality very good; much better than previous year; seed sown, 5 to 6 bushels per acre. *Harvest*—Very good; started first week in August and finished early in September; not unduly protracted; ample labour available, chiefly prisoner of war; crop secured in very good condition. *Hay*— $2\frac{1}{2}$ tons per acre; good quality; better than last year. *Meadow Hay*—None grown. *Potatoes*—Average yield, 9 to 10 tons per acre; about 3 tons per acre better than last year; disease showed on haulms in August, but did not affect the tubers to any extent; crop good quality and practically disease free; no new varieties reported. *Turnips*—A good crop; rather better than last year's; 25 to 30 tons per acre; quality good; brairded well; one sowing only. *Insects*—No trouble experienced. *Weeds*—No injury caused; no charlock to be seen. *Pastures*—Better than last year. *Live Stock*—Did very well; cattle and sheep generally were free from disease. *Clip of Wool*—Quality good; average quantity.

EAST LOTHIAN (Lower). *Wheat*—Less grown in 1945 owing to the very wet back-end of 1944; crop good average yield of 50 bushels per acre; quality very good; straw, 2 tons per acre; seed sown, 3 bushels per acre. *Barley*—A good crop which stood well; yield of grain slightly disappointing; average, 56 bushels per acre; quality good; straw, 25 cwt. per acre; seed sown, $2\frac{1}{2}$ to $3\frac{1}{2}$ bushels per acre. *Oats*—A good standing crop; about

80 bushels per acre ; quality good ; straw, 35 cwt. per acre ; seed sown, 4 to 5½ bushels per acre. *Harvest*—Began about end of first week of August ; weather very good, and crop secured in first-class condition. *Hay*—The only crop grown is ryegrass ; mostly a little thin on the ground, but otherwise good ; weather at hay-time was good, and the quality the best for some years ; yield, 3 tons per acre. *Meadow Hay*—None grown. *Potatoes*—Yield, about 2 tons per acre higher than in 1944 ; earlies good ; digging began about 12th June ; lates lifted under good conditions ; considerable blight in some places ; yield, about 9 tons per acre. *Turnips*—The best crop for a good many years ; braided well ; no second sowing needed ; in many cases yield well over 30 tons per acre. *Insects*—Good supply of rain all the early growing season prevented insect pests ; damage less than usual. *Weeds*—Fewer in crop than usual, with the exception of thistles, which seem to be increasing everywhere. *Pastures*—During the season were above average. *Live Stock*—Everywhere did very well ; cattle and sheep generally were free from disease. *Clip of Wool*—Average.

BORDER DISTRICT.

BERWICKSHIRE (Merse). *Wheat*—Acreage considerably reduced partly due to a wet autumn ; some leeway recovered by increased sowings of spring varieties, which ultimately gave a better yield than winter sown ; total yields well below average ; from 24 to 30 bushels of moderate quality ; bushel weight, 61½ lb. ; straw short ; 27 cwt. per acre ; seed sown, 3 to 4 bushels per acre. *Barley*—Lodged badly early in season and proved difficult to cut ; quality generally below normal and yields moderate ; 36 to 44 bushels per acre at 54 lb. per bushel ; straw soft and broken ; 23 cwt. per acre ; seed sown, 2½ to 2½ bushels per acre. *Oats*—Generally the best cereal ; considerably laid and twisted by harvest time, but mostly secured before weather broke ; grain of good quality ; 54 to 64 bushels per acre ; natural bushel weight, 42½ lb. ; straw of good quality, 26 cwt. per acre ; seed sown, 5 bushels per acre. *Harvest*—Began by mid-August in fine weather ; a break in the weather in the second and third weeks of September delayed completion until the end of the month or into October, but little serious damage was done ; a large acreage was combined satisfactorily. *Hay*—Average crop of 30 cwt. per acre was secured in good order, mostly having a good show of clovers. *Meadow Hay*—A useful crop of 25 cwt. per acre, mostly well secured. *Potatoes*—Not a big crop, but sound and kept well in pits ; little disease ; conditions for lifting were not ideal as the weather was broken ; a greater acreage of second earlies now being planted with a view to spreading the work out to better advantage. *Turnips*—One of the poorest crops of recent years, varying from 15 to 26 tons per acre ; "finger and toe" was prevalent, and frost damaged a considerable acreage, making a shortage of feed in spring ; little if any resowing was required, but conditions all summer retarded the usual growth. *Insects*—Moth was fairly common, and wireworm accounted for some loss. *Weeds*—With continual cropping perennial weeds were exceedingly prevalent ; more use is made of sprays to retard these, but with labour shortage root crops not hoed as these ought to be. *Pastures*—Growth and quality good ; there was never any shortage except in the forepart of the season. *Live Stock*—Had a good grazing season ; cattle and sheep generally were free from disease. *Clip of Wool*—Average weight of fair quality.

BERWICKSHIRE (Lammermoor). *Wheat*—Decrease in acreage owing to wet autumn ; less disease ; yield, 38 to 40 bushels per acre ; seed sown,

4 bushels per acre. *Barley*—No substantial difference in acreage; crop sown very early and stood well; yield disappointing; 30 to 42 bushels per acre; seed sown, 3 to 3½ bushels per acre. *Oats*—Early sown, and well grown; above average in quality and quantity; 36 to 50 bushels per acre; seed sown, 5 to 6 bushels per acre. *Harvest*—Began early and finished in good time; mostly secured in good condition; great quantity of barley threshed direct from the stook; more combines in use than ever. *Hay*—Fair; secured in good order; rather heavier than in 1944; baling hay in the field more common. *Meadow Hay*—Good crop; well secured in spite of shortage of labour. *Potatoes*—Slight increase in total acreage; planted in good time; crop again affected by blight, which caused some damage in pits; yield, better, 6 to 8 tons per acre. *Turnips*—Sowing completed very early, in some cases by 28th May; some disease, including "finger and toe"; weight of crop slightly up on average. *Insects*—Damage less than usual. *Weeds*—Runches and wrack got a good start, and flourished throughout the summer; too many thistles in grain crops. *Pastures*—Grass came a fortnight earlier than usual, but suffered a severe check in end of April; grazed well through the summer and right on until beginning of winter. *Live Stock*—Throve well throughout the summer; much less disease than usual, death-rate among lambs being much lower. *Clip of Wool*—Quality good; weight of Half-bred clip average; hill stocks not so heavy as last year; dip-staining of wool has become serious.

ROXBURGHSHIRE. *Wheat*—A fair average yield, about 48 bushels per acre, although some, especially spring varieties, were considerably larger; straw normal; in comparison with 1944, quality of grain and straw much better; seed sown, from 4 to 5 bushels per acre. *Barley*—Good average; from 36 bushels to 70 bushels per acre, high yields being generally from "Maja" or "Abed Kenia"; some high-lying fields produced big yields of these varieties; quality an improvement on last year. *Oats*—Good crop generally, with an average of about 65 bushels per acre; grain rather under average for quality, many lots being of poor natural weight; straw about average in quantity, but quality very good; all over, superior to last year. *Harvest*—Fairly general about the middle of August; there was an absence of drying winds and some fields were stacked too soon; a considerable amount of threshing was done out of the stook; conditions generally were good. *Hay*—Quantity per acre average, and in general the quality very good. *Meadow Hay*—Average crop of good quality. *Potatoes*—Crop only fair, with a considerable quantity of diseased tubers. *Turnips*—Crop braided fairly well; yield not so good as last year and under average, with disease prevalent; a wet spell of weather towards the end of May held up operations. *Insects*—Not much damage done. *Weeds*—Injury similar to former years, although charlock was very prevalent. *Pastures*—Maintained a good growth, particularly so late in the grazing season. *Live Stock*—All throve exceptionally well; a few cases of pneumonia amongst lambs in autumn. Cattle and sheep generally were free from disease. *Clip of Wool*—Average clip both in quantity and quality.

SELKIRKSHIRE. *Wheat*—Very little grown. *Barley*—Similar acreage to last year sown; crops good and stood well; yield, 38 to 48 bushels per acre; seed sown, 3½ bushels per acre. *Oats*—An increased acreage grown; a good crop generally with less "laid" grain than usual; yield above the average; 40 to 50 bushels per acre; seed sown, 5 to 6 bushels per acre; more light oats than usual, but a very good sample. *Harvest*—Commenced about the usual time; mostly stacked in fields and secured in excellent condition, in record time. *Hay*—Ryegrass, where top-dressed early, an excellent crop. *Meadow Hay*—An average crop. *Potatoes*—Much

better than last year, and secured in good condition ; 7 to 9 tons per acre ; no disease, and no new varieties planted. *Turnips*—Average ; late-sown fields rather disappointing, the result of wet weather in the end of May ; more “finger-and-toe” disease and “dry-rot” than usual. *Insects*—No damage reported. *Weeds*—Damage average ; little cleaning done on account of labour shortage. *Pastures*—Came early in spring, were abundant all through the season, and lasted well into the autumn. *Live Stock*—Did well, and cattle and sheep generally were free from disease. *Clip of Wool*—Average and of good quality.

PEEBLESSHIRE. *Wheat*—Quite good, but acreage less than usual on account of the exceptionally heavy rainfall in the late autumn ; winter-sown wheat stood better and threshed much better than the spring-sown, which had a tendency to lodge badly ; yield, from 40 to 48 bushels per acre ; seed sown, generally $3\frac{1}{2}$ bushels per acre. *Barley*—Very good crop, but was badly laid and proved very expensive to harvest ; the yield was rather above the average and the quality good ; 48 to 54 bushels per acre ; on poorer land from 36 to 40 bushels per acre ; seed sown, fully 4 bushels per acre. *Oats*—Generally good, although on old lea there was some damage by grub ; ears very well filled and yield above average, from 48 to 64 bushels per acre ; on later and high districts from 32 to 40 bushels per acre ; seed sown, 5 to $5\frac{1}{2}$ bushels per acre ; thick-skinned oats on high districts from 6 to $6\frac{1}{2}$ bushels per acre. *Harvest*—Much about the usual time ; weather excellent although there was a lack of wind, and grain which was handled too quickly and put in big stacks possibly deteriorated through heating ; crops, generally, were in good condition. *Hay*—Slightly below the average ; a proportion was damaged by wet weather, but the bulk was got in excellent order. On good land from 40 to 50 cwt. per acre was the average, but on lighter soils from 28 cwt. per acre upwards. *Meadow Hay*—An average crop. *Potatoes*—A large crop, considerably above the average ; certain varieties were affected by blight and slight disease, but the quality, on the whole, was very good ; on good potato land 8 to 10 tons per acre, but the average overall was from 6 to 8 tons per acre. *Turnips*—Swedes were excellent and in many cases decidedly above the average ; Yellows, on the other hand, were disappointing, although there were some fair crops ; some braided and came to the hoe well, but suffered badly from “finger and toe” and fungus at the roots. *Insects*—A certain amount of damage occurred. *Weeds*—Some very dirty fields were caused no doubt by large breaks and great shortage of labour. *Pastures*—The grass came very early in the season and was of excellent quality ; clovers particularly good. *Live Stock*—Did well ; both cattle and sheep were free from disease. *Clip of Wool*—Quality good ; quantity slightly above the average.

DUMFRIES DISTRICT.

DUMFRIES (Annandale). *Wheat*—Rather smaller acreage grown ; a good crop where land was suitable ; well harvested and should thresh rather better than last year ; average, 26 cwt. per acre ; seed sown, 4 bushels per acre. *Barley*—Large acreage sown ; well harvested and threshed out a good sample ; 20 to 22 cwt. per acre ; seed sown, $2\frac{1}{2}$ to 3 bushels per acre. *Oats*—Acreage similar to last year ; crops usually heavy, but stood up well, and were very well harvested ; 55 bushels per acre on good land ; 30 to 40 bushels per acre in the higher districts. *Harvest*—Started in second week of August and finished generally in second or third week September ; one of the best harvests in living memory, with grain of good quality and colour. *Hay*—Ryegrass an average crop ; fairly well

secured; 35 cwt. per acre. *Meadow Hay*—Average crop; very well secured; 30 cwt. per acre. *Potatoes*—Acreage similar to last year; crop rather smaller; 7 tons per acre; a good deal of blight on some varieties; lifting started 1st October in good weather; mostly stored in dry condition; the usual varieties planted. *Turnips*—Braided well in most cases; return about similar to last year; 18 tons per acre; a good deal of "finger and toe" reported on some farms. *Insects*—Not much damage done. *Weeds*—Owing to shortage of labour the usual annual weeds were very plentiful. *Pastures*—Grazing not up to average owing to cold weather in June and the reduced acreage for stock grazing. *Live Stock*—Did fairly well, but were hardly up to average; cattle and sheep generally were free from disease. *Clip of Wool*—Good quality; weight average.

DUMFRIES (Nithsdale). *Wheat*—None grown. *Barley*—None grown. *Oats*—A good crop; most of it stood well, ripened early, and was easily cut. *Harvest*—Cutting general by 10th August, and crops were all in by end of September; secured in fairly good order; owing to good weather some stacked rather quickly, and a little heating occurred in places. *Hay*—A fair crop, but not so heavy as last year; most of it well got. *Meadow Hay*—Almost last year's bulk, very quickly and easily got; quality very good, much of it being stored without damage by rain. *Potatoes*—Fair; not so heavy as last year; about 6 tons per acre; more disease than last year; lifted in ideal weather; quality good. *Turnips*—About 14 to 21 tons per acre; braided well, but were very dirty; no resowing; stored in ideal weather and very quickly on that account. *Insects*—No damage reported; still too many wood-pigeons. *Weeds*—Came away strongly in August. *Pastures*—Of average growth; better than last year. *Live Stock*—Pastures were good, but cattle, especially dairy cows, were much disturbed in grazing by flies, byres having to be sprayed before milking times from July to September. Cattle and sheep free from disease, except for "trembling," &c., in ewes and lambs. *Clip of Wool*—Good; as heavy as last year.

DUMFRIES (Eskdale). *Wheat*—None grown. *Barley*—Practically none grown. *Oats*—Lea oats mostly very good, but those following turnips, &c., very disappointing, and on the majority of farms only about half a crop; it is very difficult to give a reason for this, as fields sown in good dry weather gave the same results as those where the land was worked in wet condition. *Harvest*—Began about the usual time and on early farms was got in good condition; later farms had a protracted harvest owing to wet weather. *Hay*—Ryegrass mostly good and got in excellent condition. *Meadow Hay*—Also very good; most of it also in excellent condition. *Potatoes*—Very varied, some farms having very good results and others very moderate; in some varieties there was a lot of disease, and reports state that on many farms the pits were more than half rotten; there were no new varieties planted. *Turnips*—Mostly good, not specially big, but very sound and kept well; braided well and very little second sowing required. *Insects*—Caused very little damage, probably less than usual. *Weeds*—Damage very varied; some fields were very bad; where time permitted the fields to be well cultivated the results were satisfactory; otherwise runches, day nettles, and other weeds were very harmful. *Pastures*—More than average growth, and quality fully better than last year. *Live Stock*—Did very well on pasture. Cattle and sheep were very free from disease; the death-rate amongst hill sheep lighter than for very many years, if not the lowest within living memory, especially among ewe hogs. *Clip of Wool*—Very disappointing when weighed, scaling much less per fleece than last year.

KIRKCUDBRIGHTSHIRE. *Wheat*—Acreage rather smaller than 1944; yield fair, about 17 cwt. per acre. *Barley*—Acreage much reduced, but with excellent harvest; what was grown did well. *Oats*—Acreage about the same as last year, but crop was very much lighter owing to wet cold weather in May and June; the yield, however, was at least 35 bushels per acre, due to the excellent harvest. *Harvest*—Cutting started second week of August, and no difficulty was experienced in cutting and harvesting without waste, thanks to excellent weather. *Hay*—Practically none was made until after 23rd July, when a spell of really excellent weather allowed it to be secured in very good condition; 40 cwt. per acre. *Meadow Hay*—A good crop secured in excellent condition; 35 cwt. per acre. *Potatoes*—Acreage similar to previous year; in many cases crop was disappointing, partly caused by growth of weeds in May and June and partly by blight, which was very prevalent; an excellent raising time, however, was experienced; yield, 5 to 7 tons per acre. *Turnips*—The wet June and early July caused this crop to get very dirty and the yield suffered; the excellent sunny autumn, however, helped the growth considerably; yield, 14 to 18 tons per acre. *Insects*—No special trouble recorded. *Weeds*—A very bad season for killing weeds in turnip and potato ground; some grain crops were also badly affected. *Pastures*—Grass came very early with the warm spring, but suffered in May; on the whole, however, an excellent grazing season. *Live Stock*—Sheep suffered from the lack of sun in May and June, but did very well in the splendid autumn; a good season for cattle; no special trouble was experienced with disease except that hoose was again very prevalent. *Clip of Wool*—Good, rather better than in 1944.

WIGTOWNSHIRE. *Wheat*—Very little grown. *Barley*—Very little grown. *Oats*—A good seed bed was got and oats braided well; grain much better filled than last year and very little laid; possible average, 42 to 44 bushels per acre. *Harvest*—Started a few days earlier than usual; crops stood up well and cutting was accomplished without much difficulty; weather became fine and warm with little wind, and those who ventured to stack too early required the thresher; those who waited got their grain in good order; after a month of good harvest weather rain came and the weather was broken for ten days; from then on oats were stacked in fair condition but rather discoloured, and straw was not first quality. *Hay*—A better crop than the previous year, about 2½ to 3 tons per acre; most of it was got in good condition, and the aftermath was good. *Meadow Hay*—Less productive, but secured in good order. *Potatoes*—Earlies showed a poor yield at first, but improved later to 6 and 8 tons per acre; some farms in certain districts suffered from frost, and yield was disappointing; the digger was much used, as labour was scarce; lates were not an average crop, and diseased on some farms; 6 tons per acre; in some places a very poor crop was lifted; weather during lifting was very good. *Turnips*—18 to 20 tons per acre; braided was generally good and very little resowing was done; a little disease has appeared in places, but generally speaking the crop, including late turnips, was sound. *Insects*—Very little damage done. *Weeds*—Dockens and thistles prevalent; red-shank fairly strong in August; on some farms weed-cutting has been neglected, but a new kind of weed killer has been tried out. *Pastures*—Better than in 1944 and much more grass in the back-end than for some years; little silage was made, but a good deal of grass drying was done. *Live Stock*—Generally did fairly well and possibly better than the previous year; milk yields fell in September rather sharply, probably due to farmers calving their stocks earlier; sheep and young stock thrived well and were in good condition. There was about the usual illness among stock; grass sickness was hardly so bad; mastitis still in the dairy herds despite great efforts to

keep it under control; hoose was bad in many places, and many calves were lost. *Clip of Wool*—Above average.

GLASGOW DISTRICT.

AYRSHIRE. *Wheat*—Grain, 25 cwt. per acre; straw, 20 cwt. per acre; average of grain slightly up from previous year; secured in excellent condition; seed sown, about 4 bushels per acre. *Barley*—Very little grown; yields, about 20 cwt. per acre, grain, and 18 cwt., straw; secured in good condition. *Oats*—Above average in quality and quantity; grain, 20 cwt. per acre; straw, 16 cwt. per acre. *Harvest*—Earlier than usual, from beginning of August on early land; much better weather right through than usual for past few years; crop in most cases secured in good condition; some isolated cases of "heating" caused through impatience rather than by bad weather. *Hay*—Good crops well secured; about 35 cwt. per acre of good quality, due to earlier harvesting and fairly open weather. *Meadow Hay*—Average quantity and quality. *Potatoes*—About average, 7½ tons per acre; quality fairly good, although "blight disease" was prevalent and started earlier than usual, about middle of July; no new varieties planted to any great extent. *Turnips*—15 tons per acre; quality very patchy, with dry-rot causing loss in storage; braided well and little resowing required; weeds very prevalent and troublesome owing to labour difficulties. *Insects*—Wireworm and grub very troublesome on early-sown lots, especially on old turf; "fly" affected kale and cabbage rather badly, and many lots had to be resown. *Weeds*—Again a menace; a moist month of June and shortage of labour made them difficult to handle; couch-grass or "quicken" increasing. *Pastures*—Above average until autumn, when grazing season was shorter than usual. *Live Stock*—Thrived well; milk yields from grass above average. Disease among dairy cattle fairly widespread—e.g., mastitis, udder clap, abortion; sheep fairly free from disease. *Clip of Wool*—Of average quality and quantity.

BUTE. *Wheat*—None grown. *Barley*—None grown. *Oats*—A very good crop throughout the island; grain, about 25 cwt. per acre. *Harvest*—One of the best on record; early, and secured in record time. *Hay*—About 2 tons per acre; early cut did not have very good weather, but later it was secured in better condition. *Meadow Hay*—Very little grown. *Potatoes*—Earlies, about 10 tons per acre; were badly frosted in May; digging was two weeks later than last year; lates, about 7 tons per acre; very little disease; no new varieties planted. *Turnips*—Similar to last year; about 20 tons per acre; very little resowing owing to fly; braird was very good. *Insects*—Less damage done by grub. *Weeds*—No appreciable damage; a few fields affected by charlock. *Pastures*—Grass above the average; more wild white clover than usual. *Live Stock*—Did specially well on most pastures; quite a few cattle suffered from udder clap; maggot-fly in sheep not so bad as usual. *Clip of Wool*—About usual standard.

ARRAN. *Wheat*—None grown. *Barley*—None grown. *Oats*—Very good; cutting was expeditiously carried out, but much was wasted by bad weather; seed sown, 6 bushels per acre. *Harvest*—Carried through in good time, but much stuff was stacked too soon with detrimental results. *Hay*—Good; about 2½ tons per acre; well got. *Meadow Hay*—Not much grown; usual medium crop. *Potatoes*—Returns very much smaller than in previous years due to early blight; some crops good and some poor. *Turnips*—About the average; no resowing. *Insects*—No damage

reported. *Weeds*—Where proper cultivation was undertaken, crops were good and clean. *Pastures*—Good all over, the result of plentiful liming at sow-out. *Live Stock*—Throve well; cattle and sheep generally were free from disease. *Clip of Wool*—About average.

LANARKSHIRE (Upper Ward). *Wheat*—From the few acres grown not much produced suitable for milling. *Barley*—Not much grown, but a fairly good crop. *Oats*—50 to 70 bushels per acre; seed sown, 5 to 6 bushels per acre; quality of both straw and grain very good. *Harvest*—Started usual time; weather good, and crop secured in good condition. *Hay*—1½ to 3 tons per acre; quality good; crop better than last year. *Meadow Hay*—Good crop, well secured. *Potatoes*—6 to 8 tons per acre, well secured; very little disease; did not keep well in pits owing to open winter; no new varieties planted. *Turnips*—Good; better than last year; no resowing; braided well. *Insects*—No injury reported. *Weeds*—Injury, less than last year; much better weather for keeping them in control. *Pastures*—Good. *Live Stock*—Both cattle and sheep thrrove well and were free from disease. *Clip of Wool*—Over average both in quantity and quality.

LANARKSHIRE (Middle and Lower Wards). *Wheat*—Grain, 17 cwt. per acre; straw, 23 cwt. per acre; some saved in very good order, but later lots suffered weather damage; very unfavourable weather in November and December 1944 had a bad effect on the yield, as much was too late in being sown. *Barley*—Very little grown. *Oats*—Grain, 18 cwt. per acre; straw, 22 cwt. per acre; quality, variable, but better than last year. *Harvest*—Carried through about the usual time; weather mostly very good, and crops secured in good order; in a few cases it was stacked too early. *Hay*—36 cwt. per acre; a lighter crop than last year. *Meadow Hay*—Very little grown. *Potatoes*—7½ tons per acre; a certain amount of disease in August; kept very badly in pits; in many cases there was a loss of 10 to 20 per cent by the month of January; no change in varieties planted. *Turnips*—About 20 tons per acre; a little trouble in braiding; second sowing in a few cases probably caused by insects. *Insects*—Attacks by leather-jackets widespread, even hay crops being affected in some instances. *Weeds*—Caused some injury; redshank and buttercup were more prominent than usual. *Pastures*—Good grazing season. *Live Stock*—Throve well; lambs particularly responded to the favourable autumn; cattle, less abortion, but more hoose, sterility, and foot-rot; sheep generally better than in 1944. *Clip of Wool*—Showed an improvement in quantity and quality over previous year.

RENFREWSHIRE. *Wheat*—Below average, especially on heavier lands, due to preceding wet autumn and in many cases late sowing; yield, 20 to 26 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Barley*—None grown. *Oats*—Below average, with light bushel-weight; grain, 20 to 25 cwt. per acre; straw about the same yield. *Harvest*—Commenced on 11th August, three days later than last year, and finished on 15th September; weather good, apart from the lack of drying winds; all grain secured in first-class order, the best and easiest harvest of the war years. *Hay*—A light crop, but secured in good order; 1½ to 2 tons per acre. *Meadow Hay*—Little grown, but secured in fair order; about 22 cwt. per acre. *Potatoes*—Good crop; 8 to 12 tons per acre; all dug and pitted in excellent order; labour more plentiful than for several years; no disease reported; no new varieties extensively grown. *Turnips*—Above average; 20 to 25 tons per acre; braided well and came quickly to the hoe; no second sowings

observed. *Insects*—Not troublesome. *Weeds*—As prevalent as usual, especially in grain crops, but more easily controlled in green crops due to good weather during summer. *Pastures*—Grazed well all through summer and well into autumn. *Live Stock*—Throve well, and several lots of good fat grass cattle found their way to the grading centres; dairy cattle also did well; little disease reported. *Clip of Wool*—Average for quality and quantity.

ARGYLLSHIRE (Lochgilhead). *Wheat*—Practically none grown. *Barley*—Very little grown. *Oats*—Satisfactory; grain, 30 to 36 bushels per acre; straw, 20 cwt. per acre; quality, very good on the whole; seed sown, 5 to 6 bushels per acre. *Harvest*—Started in good time and finished early except on some of the later farms, where broken weather in the latter half of September caused delay; secured on the whole in good condition. *Hay*—Much the same as last year; 20 to 25 cwt. per acre; quality, varied. *Meadow Hay*—Similar to last year. *Potatoes*—Returns about the same as last year; 5 to 6 tons per acre; not much disease; favourable weather made lifting much easier than usual; no new varieties. *Turnips*—Similar to last year as to quantity and quality; 20 to 25 tons per acre; braided well; no resowing required. *Insects*—No extensive injury. *Weeds*—Not much damage caused; not more than usual. *Pastures*—Were of average growth and quality compared with 1944. *Live Stock*—Did very well; no disease reported among cattle and sheep. *Clip of Wool*—Average in quality and quantity.

ARGYLLSHIRE (Kintyre). *Wheat*—Very little grown; grain about 25 cwt. per acre; seed sown, $3\frac{1}{2}$ bushels per acre. *Barley*—Crops not so good as last year; 18 cwt. per acre; quality of grain and straw good; seed sown, about 4 bushels per acre. *Oats*—Acreage maintained; red land corn gave a low yield, probably about 12 cwt. per acre, ranging from 10 to 22 cwt. per acre; straw, 20 to 25 cwt. per acre; seed sown, 5 bushels per acre; low yield attributed to cold spring and particularly cold, wet May. *Harvest*—Began in fair time, but a lack of winning weather caused heating in stacks; the early farms fared best. *Hay*—Good; 30 to 35 cwt. per acre, well got; crop slightly better than in previous year. *Meadow Hay*—Secured in fairly good order, and gave a fair return. *Potatoes*—Blight occurred fairly early, and a few acres were sprayed; crops were not too early, but were secured in much better condition than in 1944; yield, similar to last year's. *Turnips*—Sowing was either very early or very wet, due to the weather in May; very few second sowings necessary; in general, a fair yield, average about 16 tons per acre. *Insects*—Not much evidence of attack, though some turnips suffered slightly from mud beetle. *Weeds*—Ragwort very prevalent; come charlock was evident in corn and some crops sprayed with sulphuric acid; shortage of labour made cutting difficult. *Pastures*—Growth up to average and well maintained; back-end mild and open, but a milder spring would have been of even greater benefit. *Live Stock*—Throve well as soon as weather improved in the spring; no serious outbreaks of disease were reported among stock. *Clip of Wool*—Slightly above average.

ARGYLLSHIRE (Islands of Islay, Jura, and Colonsay). *Wheat*—None grown. *Barley*—None grown. *Oats*—Fairly good; 43 bushels per acre; 40 lb. per bushel; straw, sound; seed sown, 5 to 6 bushels per acre. *Harvest*—Began about 20th August and finished about 5th October; weather fairly good and interruptions were few; crops stood up well, and much use was made of A.E.C. tractor service; crop generally well secured

most difficulty was experienced in late cutting. *Hay*—About the same as last year, 26 cwt. per acre for ryegrass, and 36 cwt. per acre for clover hay. *Meadow Hay*—Also same as last year. *Potatoes*—Generally poor and seldom exceeded 6 tons per acre; blight or allied disease was present early in July, and tubers did not develop well; usual varieties grown. *Turnips*—About 15 or 16 tons per acre; again a trifle below average year in bulk; braided well, but remained stationary for a period and made most growth late in season; second sowings seldom required. *Insects*—Damage slight and no greater than usual. *Weeds*—Somewhat difficult, and for a period most crops looked very dirty; wet weather aided their growth. *Pastures*—Did rather better, and a very mild autumn kept growth going well into mid-winter. *Live Stock*—Did very well, and remained out on the grass much later than usual; both cattle and sheep summered well, although lambs did not make quite as good growth as in 1944. *Clip of Wool*—Average weight and quality.

STIRLING DISTRICT.

DUMBARTONSHIRE (Upper). *Wheat*—Good crop; secured in good condition; about 35 bushels per acre; straw, 34 cwt. per acre; quality good; seed sown, 3 to 4 bushels per acre; *Barley*—Very small acreage grown; quality poor. *Oats*—Average to good crop; secured in good condition; 40 bushels per acre; straw, 35 cwt. per acre; good quality for fodder; seed sown, 4 to 5 bushels per acre. *Harvest*—About the usual time; cutting was fairly easy with very little laid; quiet weather made it lie longer in stook, and some was inclined to be stacked too soon, resulting in some heating. *Hay*—Yield, about 25 cwt. per acre; secured in good condition. *Meadow Hay*—Best crop for a number of years; secured in good condition. *Potatoes*—Averaged about 6½ tons per acre; blight very prevalent, resulting in good deal of waste in pits of some main-crop varieties; no new varieties grown. *Turnips*—Considerably better than last year; 25 tons per acre; braided well; no resowing. *Insects*—Insect pests were not so numerous as previously; a turnip fly causing maggots in the roots prevented them keeping well. *Weeds*—Crops were cleaner than last year; the worst offender was redshank. *Pastures*—Poor at beginning of season, but maintained average growth throughout remainder. *Live Stock*—Did well, especially towards the end of the season. Cattle and sheep were generally free from disease. *Clip of Wool*—About average quality; quantity a little over the average.

DUMBARTONSHIRE (Lower). *Wheat*—Sown under very adverse conditions and braided rather thinly; improved in spring and early summer and harvested a good average of good quality; 45 bushels per acre at 59 lb. per bushel; straw, about 30 cwt. per acre; seed sown, 3½ bushels per acre. *Barley*—None grown. *Oats*—Sown under good conditions; braided evenly; a good average yield which threshed well; quality of grain and straw good, and harvested in much better condition than in the previous year; 50 bushels per acre at 39 lb. per bushel; seed sown, 5½ bushels per acre; straw, about 25 cwt. per acre. *Harvest*—Started rather earlier than usual and was carried through expeditiously under good conditions; slight damage caused by "heating" in stacks through abnormally quiet, mild weather. *Hay*—Bulked rather better than last year; quality generally excellent; about 2 tons 2 cwt. per acre. *Meadow Hay*—Rather heavier than last year, and of good quality. *Potatoes*—Better than in 1944; about 7½ tons per acre; disease made its appearance

in September and affected the keeping properties in the pits; no new varieties planted. *Turnips*—Braided well, and came regularly to singling; bulked well and were of good quality; yield, 18 tons per acre. *Insects*—Very little damage done. *Weeds*—Turnips suffered a little from annual weeds after singling, redshank being most troublesome. *Pastures*—Fairly good throughout the season, and continued fresh into late autumn. *Live Stock*—Both sheep and cattle made very good progress during the grazing season; sheep were singularly free of maggot-fly strikes during the summer; mastitis troublesome amongst dairy cattle. *Clip of Wool*—Of good quality, and the weight per fleece rather above average.

STIRLINGSHIRE (West). *Wheat*—Very little grown. *Barley*—None grown. *Oats*—Below average; well secured; quality, both grain and straw, excellent; 16 cwt. per acre; seed sown, 5 bushels per acre. *Harvest*—At usual time; rapidly secured in extremely favourable weather and in good condition. *Hay*—Quality fair; quantity usual; about 30 cwt. per acre; early crops a little spoiled by weather. *Meadow Hay*—Average; fairly good condition; weather improved for later crops. *Potatoes*—Yield better than last year, but still only 7 tons per acre; not much disease at digging, but kept badly in pits, possibly due to the fact that weather was very dry at lifting, and tubers were bruised when being stored for lack of protection from soil adhering. *Turnips*—20 tons per acre; quality sound; good braird, but slow on heavy land; no resowing; smaller crop than last year, probably due to late sowings. *Insects*—No damage reported. *Weeds*—Heavy land dirty; persicaria gave trouble; damage persistently high. *Pastures*—Above average in growth and quality. *Live Stock*—Did very well. Cattle and sheep generally were more free from disease than usual; mastitis and udder clap much reduced; lambing sickness and pregnancy toxæmia less than usual. *Clip of Wool*—Average: quality good.

STIRLINGSHIRE (East). *Wheat*—35 bushels per acre; straw, 25 cwt. per acre; quality, only fair, owing to the lack of wind; many acres had to be ploughed up, owing to the wet back-end, and much was never sown; seed sown, 4 bushels per acre. *Barley*—30 to 40 bushels per acre; straw, 20 cwt. per acre; quality, only fair; seed sown, 3 to 4 bushels per acre. *Oats*—Not so heavy as last year; 40 bushels per acre; straw, 20 cwt. per acre. *Harvest*—Started second week in August, but was very slow, owing to the lack of wind; as a result many acres were too hurriedly stacked. *Hay*—Cutting started last week in June and hay secured in fine order; ryegrass, 35 cwt. per acre; timothy, 60 to 70 cwt. per acre. *Meadow Hay*—Good crop, of great quality; 25 to 30 cwt. per acre. *Potatoes*—Not a big crop; 6 to 8 tons per acre; some varieties very poor; disease showed in many cases before digging; no new varieties grown. *Turnips*—Not so good as last year; many acres were late in being sown and did not bulk out; braird only fair; a little resowing; "finger-and-toe" prevalent. *Insects*—Some of the oat crop was destroyed by grub; otherwise not much damage done. *Weeds*—Not very bad, except where charlock got out of hand in the turnip crop; a very little redshank. *Pastures*—Came very early, and got a check in June; recovered in the beginning of August and came away excellently. *Live Stock*—Cattle did well, and went on grazing till the end of the year; udder clap amongst dairy cattle not so bad as last year; a certain amount of maggot amongst sheep. *Clip of Wool*—Quality and quantity up to average.

CLACKMANNANSHIRE. *Wheat*—As last year, early sown crops did well; owing to the wet autumn of 1944 acreage was much smaller than usual;

much that was late sown did not do well ; average, 32 to 48 bushels per acre ; straw, 20 to 25 cwt. per acre ; seed sown, 4 bushels per acre. *Barley*—Good crop, 40 to 50 bushels per acre ; straw, much shorter than usual, 15 to 20 cwt. per acre ; seed sown, 3 to 4 bushels per acre. *Oats*—Braided well ; red land oats somewhat short of straw ; 40 to 50 bushels per acre ; straw, 15 to 25 cwt. per acre ; seed sown, 4 to 6 bushels per acre, according to variety. *Harvest*—Began about a week earlier than last year ; early harvested grain secured in excellent condition ; some, later harvested, was discoloured. *Hay*—Clover heavier than last year ; 40 to 45 cwt. per acre ; timothy, much the same, up to 4 tons per acre ; very well got. *Meadow Hay*—Little grown. *Potatoes*—Kerr's Pink, 7 to 9 tons per acre ; Golden Wonder, 6 to 7 tons per acre ; more uniform size than last year ; Red-skin continued to crop well, 10 to 11 tons per acre ; some disease reported among white ware and Kerr's Pink ; with help from school children and ideal weather all secured in excellent condition. *Turnips*—Braided well ; where early sown a good crop, 20 to 25 tons per acre ; many farmers delayed by wet weather in the middle of May ; those sown later, 10 to 15 tons per acre ; no second sowing reported. *Insects*—No damage reported. *Weeds*—Redshank, chickweed, and charlock caused some damage ; not so much as last year. *Pastures*—Grass came early in April and then received a check (due to cold, wet weather), from which it did not recover until mid-summer ; continued well into the late autumn. *Live Stock*—Grazed well, particularly in the latter part of the year ; cattle and sheep were free from disease. *Clip of Wool*—Quantity about 6 per cent less than last year ; quality a little better.

PERTH DISTRICT.

PERTSHIRE (Central). *Wheat*—Yield good, 40 to 44 bushels per acre ; straw, 24 to 30 cwt. per acre ; seed sown, 4 bushels per acre. *Barley*—Larger acreage grown ; crop good ; 30 to 52 bushels per acre ; straw, 15 to 20 cwt. per acre ; seed sown, 3 to 3½ bushels per acre. *Oats*—Larger acreage grown ; yield very good ; 36 to 60 bushels per acre ; straw, 18 to 30 cwt. per acre ; seed sown, 5 to 7 bushels per acre. *Harvest*—Was early, with very slow winning weather at first, which caused quite a few warm stacks ; crop on the whole secured in good condition. *Hay*—A good crop, with plenty of clover in most cases ; 1 to 2 tons per acre ; well secured except those which were very late. *Meadow Hay*—Good crop, secured in fair condition. *Potatoes*—Good crop ; 4 to 9 tons per acre ; earlies badly diseased ; easiest potato harvest for years. *Turnips*—Good average crop ; swedes, 24 to 30 tons per acre ; yellows, 18 to 24 tons per acre ; crop braided well, one sowing being sufficient. *Insects*—There was not much damage done. *Weeds*—Very little injury caused. *Pastures*—Very good. *Live Stock*—Cattle and sheep made exceptionally good gains and were free from disease. *Clip of Wool*—A good average clip.

FIFESHIRE (Middle and Eastern). *Wheat*—32 to 40 bushels per acre ; straw, about 30 cwt. per acre ; seed sown, 3½ to 4 bushels per acre. *Barley*—35 to 52 bushels per acre ; straw, 20 to 30 cwt. per acre ; seed sown, 2½ to 4 bushels per acre. *Oats*—Again a good crop ; 48 to 80 bushels per acre ; straw, 20 to 30 cwt. per acre ; seed sown, 5 to 6 bushels per acre. *Harvest*—Started about usual time ; weather about average ; most of crop secured in very good condition. *Hay*—1½ to 2½ tons per acre ; secured in good weather ; quality good. *Meadow Hay*—None grown. *Potatoes*—Very variable ; some very badly affected by blight ; 4 to 10 tons per acre. *Turnips*—15 to 25 tons per acre ; considerably less than last year

a number of fields badly affected by "finger-and-toe" disease. *Insects*—No injury to report. *Weeds*—Wheat and barley badly affected by wild tares. *Pastures*—Were of average growth and quality as compared with last year. *Live Stock*—Throve well, cattle and sheep being generally free from disease. *Clip of Wool*—Average.

FIFESHIRE (Western). *Wheat*—Owing to weather conditions acreage appreciably reduced, particularly on wetter lands; more therefore sown in spring; brairds irregular and yields reduced, 28 to 32 bushels per acre; rust, troublesome in previous years, not so apparent; seed sown, 4 bushels per acre; proportion of straw to grain extremely high. *Barley*—Slightly less sown, but under ideal conditions; brairded well and yielded 40 to 44 bushels per acre; considerably fewer laid crops than usual; seed sown, 2 to 4 bushels per acre. *Oats*—Reduced acreage; sown under good conditions; crop failed to bulk, mainly on account of excessive rain in early spring; many fine samples, but yield generally light and showing much variation; from 36 bushels per acre on higher lands to 68 bushels on better land; straw much below average, leaving many farms short of fodder; seed sown, 5 to 7 bushels per acre. *Harvest*—Started middle of August; that month and first half of September were practically without rain; harvest speedy, although absence of drying winds made stacking difficult; later districts had a small proportion of spoiled grain. *Hay*—Cutting delayed owing to wet weather; crop rather mature and quality reduced; an improvement in weather made stacking easier; 35 cwt. per acre. *Meadow Hay*—Not much grown; reasonably well got. *Potatoes*—Below average yield; considerably varied owing to planting being interrupted at beginning of May, and to early blight; 3 to 6 tons per acre; harvested generally under good conditions, but owing to blight not keeping well in pits; record proportion dressed and railed before end of year. *Turnips*—More variation in yield than usual; return below average, mainly owing to late sowing; 12 to 16 tons per acre; little second sowing reported; slight insect damage; stored under exceptionally good conditions; higher proportion than usual pitted early. *Insects*—Accounted for some wheat failures, but generally little damage done. *Weeds*—Less troublesome than usual, considering amount of rain in early summer. *Pastures*—Grass came away very early, but was severely checked by May frosts; this meant scarce grazing in early summer and wealth of clover later in the season; growth continued well into late autumn, giving abundance of late keep. *Live Stock*—Did well on pastures; no disease reported. *Clip of Wool*—Average.

PERTHSHIRE (Eastern). *Wheat*—Winter wheat good, a little better than last year, 35 to 45 bushels per acre; seed sown, 3 to 4 bushels per acre; samples very good. *Barley*—Good on well-farmed land; more being sown owing to price being more remunerative than wheat; 40 to 48 bushels per acre; seed sown, 3 to 3½ bushels per acre; samples quite as good as last year. *Oats*—Good crop, better than last year; 52 to 60 bushels per acre; seed sown, 4 to 6 bushels per acre. *Harvest*—Started about the usual time, early August, and was satisfactory; although weather was good an absence of wind caused a lot of grain to be led in too quickly, causing much heating of stacks. *Hay*—Good on the best farms, but only moderate on others; about 45 cwt. per acre; mostly ryegrass grown; quality good. *Meadow Hay*—Average; secured in good condition. *Potatoes*—A good crop, but showing some disease, especially among earlies; 6 to 9 tons per acre; some complaints about keeping badly, although lifted in very good condition; very few new varieties grown. *Turnips*—Fair; not as good as last year; 28 to 32 tons per acre; brairded well, but showed

tendency to "finger-and-toe" disease spreading. *Insects*—No damage occurred. *Weeds*—Caused no injury to crops, but some, especially wild tares in grain crops, increased. *Pastures*—Came away early and were good till a very cold spell in May, which left them very bare for a time until heat came, especially noticeable with young grass. *Live Stock*—Cattle thrive quite well, but got a slight check in May; owing to the very fine weather in autumn they did well on grass till October; cattle and sheep were free from disease. *Clip of Wool*—Average, and of good quality.

PERTSHIRE (Western). *Wheat*—Acreage reduced from last year; some crops resown in spring; yield not up to average, 30 to 35 bushels per acre; straw, 15 to 20 cwt. per acre; seed sown, 4 bushels per acre. *Barley*—Less barley sown, owing to losses in previous years; average crop; seed sown, 3 to 4 bushels per acre. *Oats*—Good crop on dry field; straw very short on carse, owing to wet spring; 35 to 50 bushels per acre; rather less than usual and grain not so well filled; seed sown, 5 to 6 bushels per acre. *Harvest*—Commenced about usual time; slow weather for winning; some damage by stacking too soon; otherwise well secured. *Hay*—Timothy, fairly good, 70 to 80 cwt. per acre; green-cut seed less than last year and seeds not so well filled; ryegrass, 25 to 30 cwt. per acre; dryfield, 45 to 50 cwt. on carse; not so much clover as usual. *Meadow Hay*—Average crop. *Potatoes*—Average crop, 7 to 8 tons per acre; better than last year, but more disease, causing loss in pits; no new varieties grown. *Turnips*—Average crop; quality good; 30 to 35 tons per acre; good braird; not much resowing. *Insects*—Very little damage. *Weeds*—Not so injurious as usual. *Pastures*—Slow to start; quality good in summer and autumn. *Live Stock*—Throve well; cattle and sheep generally free from disease; some cases of poisoning believed to be due to disposal of military stores. *Clip of Wool*—Average and of good quality.

PERTSHIRE (Highland). *Wheat*—Not generally sown; only a few acres on suitable farms. *Barley*—In most cases fair, but badly laid on some farms; about 40 bushels per acre; seed sown, about 4 bushels per acre. *Oats*—Average acreage sown; crop, average; natural weight about 42 lb. per bushel; seed sown, 6 bushels per acre. *Harvest*—Began in the middle of August, but owing to weather conditions was not finally completed until end of September; where laid, grain and straw were inferior in quality. *Hay*—Average and of good quality; 35 cwt. per acre; well secured. *Meadow Hay*—Not much grown; average crop. *Potatoes*—Average about 6 tons per acre; lower by 2 to 3 tons per acre on most farms; blight in evidence in certain varieties; crop generally secured under favourable conditions, notwithstanding shortage of labour; no new varieties grown. *Turnips*—Average 20 tons per acre; braided well; no second sowing required. *Insects*—No damage recorded. *Weeds*—More in evidence than in former years; somewhat difficult to control owing to prevailing weather during summer. *Pastures*—An average grazing season. *Live Stock*—Throve fairly well; cattle and sheep free from disease; a few isolated cases of grass sickness amongst horses. *Clip of Wool*—Good quality; about an average crop.

ABERDEEN DISTRICT.

ANGUS (Western). *Wheat*—40 bushels per acre; straw good, grain average sample; seed sown, 3 to 4 bushels per acre. *Barley*—46 bushels per acre; straw mostly good and grain up to average sample; seed sown,

3 to 4 bushels per acre. *Oats*—56 bushels per acre; straw good, but grain not so clean a sample as last year. *Harvest*—Began first week in August; one of the best harvests for years; mostly secured in good condition, except where prematurely stacked, which resulted in heating. *Hay*—30 cwt. per acre; of average quality; ryegrass did well, but clover short in some crops; weather rather broken. *Meadow Hay*—None grown. *Potatoes*—About 5 tons per acre; disease not so bad as last year, but considerable dry scab, which developed in the pits, especially in *Epicure* and *Majestic*; no new varieties; no break in weather during lifting. *Turnips*—22 tons per acre, of good quality; braided well; no resowing; yellow turnips did not do well in some places. *Insects*—Some cabbage and kale attacked by fly; as last year, no injury was reported. *Weeds*—More plentiful; "eye nettle" very prolific; damage about same as usual. *Pastures*—Average growth and quality. *Live Stock*—Throve well; cattle and sheep generally were free from disease. *Clip of Wool*—Good average.

ANGUS (Eastern). *Wheat*—Fairly good crop, about 44 bushels per acre; where well got, natural weight 63 lb. per bushel; "pickles" smaller than most years; straw, 30 to 35 cwt. per acre; stood up well; seed sown, $3\frac{1}{2}$ bushels per acre. *Barley*—Good on good land where allowed to ripen properly; grain, 56 bushels per acre of top quality, 56 lb. per bushel; seed sown, $3\frac{1}{2}$ to $3\frac{3}{4}$ bushels per acre. *Oats*—Good, rather over the average at 80 to 96 bushels per acre; well secured and a good colour; excellent straw, 30 to 40 cwt. per acre; stood up better than in most years; seed sown, 4 to $5\frac{1}{2}$ bushels per acre. *Harvest*—Began about usual time, 20th August, with very favourable weather and was quickly secured; through shortage of labour towards the finish some crops were spoilt by rain and close "mochy" weather. *Hay*—Generally well and quickly secured; not quite up to average weight, but well mixed with clover; about 2 tons per acre or slightly over; aftermath was abundant. *Meadow Hay*—Practically none grown; land all under crop by order. *Potatoes*—A heavier crop than last year by a ton or two per acre, but increase cancelled out by presence of blight; disease began in the second or third week of August; weather after that prevented it spreading; crop about 8 to 10 tons per acre. *Turnips*—Some "finger-and-toe" in places where cross cropping happened, but elsewhere sound, very good heavy crops resulted; 30 tons per acre quite common, and a good 25 tons an average; kept growing till after new year; no trouble with braiding, and very little second sowing was done except where land was worked too wet. *Insects*—None were noted. *Weeds*—Most trouble caused by wild tares, especially in wheat; spraying for that in 1946 was suggested. *Pastures*—Good all season, but a little later than usual; got too bare before early June, when white clover first appeared; stood well after that into autumn. *Live Stock*—Did remarkably well after 10th June; cattle and sheep developed no diseases of note or of unusual kind. *Clip of Wool*—Good quality and of good weight.

KINCARDINESHIRE. *Wheat*—36 bushels per acre; grain and straw very good quality; seed sown, 3 to 4 bushels per acre, drilled. *Barley*—40 bushels per acre; grain and straw very good quality; seed sown, 3 to 4 bushels per acre; drilled. *Oats*—52 bushels per acre; grain and straw very good quality; seed sown, 4 to 8 bushels per acre. *Harvest*—Commenced on 20th August, was carried through in record time, and secured in excellent condition. *Hay*—Good crop, 2 tons per acre; first half secured in good condition, second half in fair condition. *Meadow Hay*—None

grown. *Potatoes*—Better than last year; 7 tons per acre; earlies suffered from blight. *Turnips*—14 tons per acre; early sown, very good quality and crop; later sown, very poor crop, badly infected with "finger-and-toe"; braided very well. *Pastures*—Even better than last season, and kept growing well into the end of the year. *Live Stock*—Did not thrive in the early part of the season, but did very well later on; cattle and sheep generally free from disease. *Clip of Wool*—Average; quality good.

ABERDEENSHIRE (Buchan). *Wheat*—Very little grown. *Barley*—36 bushels per acre; seed sown, 3 bushels per acre. *Oats*—Good crops, well harvested; 32 to 56 bushels per acre; seed sown, 5 to 7 bushels per acre. *Harvest*—Started about mid-August; good weather; all secured. *Hay*—Below average; well got if not too early cut; 30 to 40 cwt. per acre. *Potatoes*—From 5 to 8 tons per acre; fully better than last year; fairly sound; some cases of blight. *Turnips*—Quality fully better than last year; 10 to 20 tons per acre; braided well; one sowing only. *Insects*—Not much injury reported. *Weeds*—Turnips difficult to keep clean; damage greater than usual. *Pastures*—Best grazing season for some years. *Live Stock*—Never better, and generally free from disease. *Clip of Wool*—Average.

ABERDEENSHIRE (Central). *Wheat*—30 bushels per acre; straw, 30 cwt. per acre; seed sown, 4 bushels per acre. *Barley*—40 bushels per acre; straw, 20 cwt. per acre; seed sown, 4 bushels per acre. *Oats*—44 bushels per acre; straw, 25 to 30 cwt. per acre; seed sown, 6 to 7 bushels per acre. *Harvest*—All completed by 1st October, and secured in good condition. *Hay*—Clover, 30 cwt. per acre; quantity and quality improved on previous years. *Meadow Hay*—Permanent grass more productive than last year; 24 cwt. per acre. *Potatoes*—6½ tons per acre; yield slightly above last year's; considerable disease in the early varieties. *Turnips*—12 to 14 tons per acre; not so good as last year and below the average; disease prevalent, mostly "finger-and-toe." *Insects*—No trouble to any extent. *Weeds*—No extensive damage. *Pastures*—During season were of average growth and quality. *Live Stock*—Did quite well. Cattle and sheep generally were free from disease. *Clip of Wool*—Average.

ABERDEENSHIRE (Strathbogie). *Wheat*—None grown. *Barley*—Average quantity grown; crops good, about 36 to 40 bushels per acre; bushel average, 54 lb.; seed sown, 4 bushels per acre. *Oats*—Better than 1944 and specially well harvested; yield, average; 44 to 48 bushels per acre, at 40 to 44 lb. per bushel. *Harvest*—Early; very well secured in very favourable weather; quantity of straw above average and of good quality. *Hay*—Not much grown. *Meadow Hay*—None grown. *Potatoes*—Quality good, although in some parts they were on the small side; average quantity grown; no new varieties; staple crops, Kerr's Pink and Golden Wonder. *Turnips*—Not so good as last year, although no resowing was necessary; on early farms crops were good, but on later farms, small. *Insects*—No trouble caused. *Weeds*—No trouble; weather favourable for cleaning the land. *Pastures*—Generally good and lasted well into the autumn. *Live Stock*—Slight increase in feeding of stock, but still restricted by milk production; cattle and sheep generally were free from disease. *Clip of Wool*—Quality good; quantity average. *General Remarks*—Frost and snow during January and part of February, but weather improved later and arrears of work were quickly overtaken. July was wet, but harvest was early and one of the best and shortest on record. Good end of year with ploughing well forward.

BANFFSHIRE (Lower). *Wheat*—None grown. *Barley*—Average crop ; about 20 cwt. per acre ; grain below average in bushel weight, less than 54 to 55 lb. per bushel ; well harvested ; straw, about 20 cwt. per acre ; seed sown, 4 bushels per acre. *Oats*—Good and very well harvested ; about 50 to 60 bushels per acre ; straw of very fine quality and well harvested, 30 cwt. per acre ; seed sown, 6 to 7 bushels per acre. *Harvest*—About usual time and secured in good order. *Hay*—About 35 tons per acre ; very good quality, fully better than last year, and well mixed with rye-grass and clover. *Meadow Hay*—None grown. *Potatoes*—Rather better than in previous year ; quantity round 6 to 8 tons per acre ; no disease ; no new varieties planted. *Turnips*—Very disappointing ; weight and quality much inferior to last year ; average, 10 tons per acre ; braided well ; no second sowing required. *Insects*—No damage to report. *Weeds*—Damage very similar to last year, chiefly due to knot-grass, yarr, and couch-grass ; enforced cropping of the land partly responsible. *Pastures*—Fully better than last year owing to the fine early spring. *Live Stock*—All thrive well throughout the grazing season ; cattle and sheep were generally free from disease. *Clip of Wool*—Average in quantity and quality.

BANFFSHIRE (Upper). *Wheat*—None grown. *Barley*—Good average returns in most districts ; generally standard weight, though some cases slightly under, probably due to being cut prematurely ; average, about 35 bushels per acre ; seed sown, 4 to 5 bushels per acre ; quality of straw good. *Oats*—Good crops generally, some very good ; average, 40 to 50 bushels per acre ; standard weight or slightly over maintained as a rule ; quality of straw very good ; seed sown, 5 to 8 bushels per acre. *Harvest*—Started about usual time ; weather on the whole good ; crops generally were secured in splendid condition ; one or two cases of stack-heating reported. *Hay*—About average and of good quality in most districts, 2 to 3 tons per acre ; some clay fields as much as 4 or 5 tons per acre. *Meadow Hay*—None grown. *Potatoes*—Mostly average returns ; complaints from some districts of under-sized tubers ; 3 to 8 tons per acre ; not much disease ; quality good. *Turnips*—Return not quite average ; 10 to 16 tons per acre ; quality good, but frost spoiled some fields ; no difficulty in braiding ; no second sowing required. *Insects*—No noticeable damage done. *Weeds*—Not many fields affected, but in one or two cases knot-grass could be seen above oats. *Pastures*—Good average growth most of season ; quality good, equal to that of last year. *Live Stock*—Did well on pasture, especially in early part of season ; a good number of cases of grass disease amongst horses. No reports of any disease amongst cattle or sheep. *Clip of Wool*—Good quality, and quite average returns.

INVERNESS DISTRICT.

NAIRNSHIRE. *Wheat*—Small acreage in the county ; about 52 bushels per acre ; seed sown, about $3\frac{1}{2}$ bushels per acre. *Barley*—About 40 bushels per acre ; seed sown, about $2\frac{1}{2}$ bushels per acre. *Oats*—56 bushels per acre ; seed sown, 6 bushels per acre, broadcast, and if drilled about a bushel less. *Harvest*—About usual time ; crop secured in good order and weather favourable. *Hay*—About the same as last year. *Meadow Hay*—Not grown in this county. *Potatoes*—About 6 tons per acre. *Turnips*—Yield below average. *Insects*—No injury recorded. *Weeds*—No injury, although "goose-foot" is becoming more prevalent. *Pastures*—Of good quality. *Live Stock*—Thrive well ; cattle and sheep free from disease. *Clip of Wool*—About average.

INVERNESS-SHIRE (Inverness). *Wheat*—About 120 acres grown, all autumn sown; matured well; average crop; good quality of grain and straw; seed sown, 4 bushels per acre. *Barley*—A good average crop on suitable land; some cases of failure on lime-deficient soils; excellent quality. *Oats*—Crop well above average in quantity and quality; straw plentiful on average land, about 40 to 60 bushels per acre. *Harvest*—Early, and one of the best and driest on record. *Hay*—Average quality and quantity; clover satisfactory; about 30 to 40 cwt. per acre on fair land; well secured. *Meadow Hay*—About average. *Potatoes*—Crop slightly above average; about 7 to 8 tons per acre; disease fairly prevalent. *Turnips*—Average, 25 tons per acre; braided well; considerable loss, owing to black frost where not lifted early. *Insects*—No reports of damage. *Weeds*—Charlock in oats and “goose-foot” in potatoes were more prevalent than usual. *Pastures*—Of average growth and quality. *Live Stock*—Throve very well; apart from contagious abortion, which appeared to increase, stock were healthy; some cases of cobalt deficiency pining; mastitis caused concern in dairy herd. *Clip of Wool*—Quality and quantity average.

INVERNESS-SHIRE (Skye). *Wheat*—None grown. *Barley*—Virtually none grown. *Oats*—Yield rather better than normally, but in a number of cases was reduced through leaf-stripe disease; about 13 cwt. grain and 19 cwt. straw per acre; quality of grain superior to previous year; straw about the same; seed sown, 5 to 6 bushels per acre. *Harvest*—Commenced rather earlier than usual and was completed about three weeks earlier; conditions were favourable except for about ten days of rain and gales, affecting principally the north-west part of the island; crops mainly secured in good condition, but some lodging occurred. *Hay*—Quantity similar to previous year, about $1\frac{1}{2}$ tons per acre; quality superior to average; exceptionally fine season for securing hay. *Meadow Hay*—Up to average in quantity per acre; larger acreage was cut and secured than in average years. *Potatoes*—Yield similar to the previous year, about $4\frac{1}{2}$ tons per acre; a considerable widespread incidence of blight showed first during early August, but some crops were not affected until early October; no new varieties recorded. *Turnips*—Weight and quality about the same as last year on average, 18 tons per acre; braided readily; no resowing; considerable incidence of heart-rot. *Insects*—Not notably injurious. *Weeds*—Rather less damage observable than for some years. *Pastures*—Slow to come, but after the end of June were productive; the autumn grazing exceptionally good. *Live Stock*—After a slow start thrived admirably, and finished in strong condition in the autumn; scarcity of milk apparent in ewes and suckling cows was due to severity of preceding winter rather than to deficient pasturage; no serious attacks of any particular disease among cattle and sheep. *Clip of Wool*—Quality up to average, but quantity about 10 per cent under.

INVERNESS-SHIRE (Lochaber). *Wheat*—None grown. *Barley*—None grown. *Oats*—An average crop secured in good order about two weeks earlier than usual. *Harvest*—The finest harvest for many years, and although labour was very difficult all crops were secured in good condition. *Hay*—A little over the average, probably about $2\frac{1}{2}$ tons to the acre; quality very good. *Meadow Hay*—About average. *Potatoes*—Good, over average, free of disease, and secured in good order; no new varieties planted. *Turnips*—Very good and kept well; only one sowing. *Insects*—No injury reported. *Weeds*—No damage; easily kept down owing to dry weather. *Pastures*—Average. *Live Stock*—Did very well; cattle and sheep generally very free from disease. *Clip of Wool*—Average.

ROSS-SHIRE (Dingwall and Munlochy). *Wheat*—Not so large an acreage grown; quite a good crop, but some fields very patchy; straw bulked well; seed sown. 3 bushels per acre. *Barley*—About the same acreage grown; a good crop, up to 56 bushels per acre on the best land; seed sown, 2 to 4 bushels per acre. *Oats*—Larger acreage grown; good crop, but some of the best fields badly lodged; on the best land up to 80 bushels per acre; straw bulked well and was excellent in quality. *Harvest*—Was a few days later than last year; weather broken to begin with, but improved, and crop secured in good order. *Hay*—Good and well got, but less grown; on best land over 2 tons per acre. *Meadow Hay*—None grown. *Potatoes*—About the same acreage; yield average; some fields badly affected with blight early. *Turnips*—Varied considerably; a good crop on some farms and on others most disappointing; some resowing was required. *Insects*—No damage reported. *Weeds*—Caused considerable injury; some turnip fields very dirty. *Pastures*—Came away early and grazed well throughout the season. *Live Stock*—Throve well, and feeding cattle were good in weight; sheep and cattle were healthy. *Clip of Wool*—Average return; quality good.

ROSS-SHIRE (Tain, Cromarty, and Invergordon). *Wheat*—Average; where sown in early November after potatoes, a fair crop of 40 bushels per acre; straw, short. *Barley*—40 bushels per acre on most farms on very good land; 50 bushels per acre from "Maja" and "Kenia"; no lodging. *Oats*—A poor crop generally, but where sown on rich land early, 60 to 65 bushels per acre; very little lodging. *Harvest*—Started about 15th August and was carried through in excellent weather; some damage from heating owing to being stacked too quickly. *Hay*—Average crop; not so well secured as the year before. *Meadow Hay*—None grown. *Potatoes*—Average yield, from 5 to 7 tons; King Edward variety badly blighted in the tuber; Majestic and Arran Pilot did not keep well in the pits in many cases; potatoes were pitted in beautiful order. *Turnips*—Very variable; on the whole a poor crop; "finger-and-toe" showed more than for a number of years, making some farms a failure; all braided well. *Insects*—No more damage than usual. *Weeds*—Farms generally getting dirty, due to extra cropping and shortage of labour. *Pastures*—Steadily deteriorating owing to intensive and war-time cropping. *Live Stock*—Bullocks summered badly; a big crop of lambs, after a good start, did not finish well, and weighed about 10 lb. under average when killed. Cattle and sheep were healthy on the whole; pneumonia in lambs on some farms for first time; outbreak of darcoptic mange on outwintered cattle due to starvation. *Clip of Wool*—Average.

SUTHERLANDSHIRE. *Wheat*—None sown. *Barley*—34 bushels per acre; straw, about 18 cwt. per acre; seed sown, about 4 bushels per acre; grain and straw, very good quality. *Oats*—A good crop, 38 bushels per acre; straw, 20 cwt. per acre; seed sown, about 4 bushels per acre; secured mostly in very good condition. *Harvest*—Completed about the usual time; weather became wet about half-way through, but cleared up after about ten days, and harvest was not long drawn out; the crop was secured in good condition. *Hay*—A good crop; on good land about 1 ton per acre; secured in very good condition; ryegrass and clover grew well. *Meadow Hay*—Was secured in good condition; yield, about 16 cwt. per acre; a smaller return than last year's, but quality better. *Potatoes*—Not so heavy as last year; at least 1 ton per acre less, at 4½ tons per acre; no disease; quality good. *Turnips*—Fairly good; average, 14 tons per acre; some second sowing owing to frost, but only on very few places. *Insects*—

No damage by fly reported. *Weeds*—There was not much damage, but some runch in fields of oats. *Pastures*—Very good during the summer. *Live Stock*—Did very well; cattle better than sheep during the season; both were very free from disease. *Clip of Wool*—Quality very good, but the return under the average for the last few years.

CAITHNESS-SHIRE. *Wheat*—An average crop; 40 bushels per acre; seed sown, 4 bushels per acre. *Barley*—Average; 32 to 36 bushels per acre; grain and straw good quality. *Oats*—Good in all districts; 40 to 44 bushels per acre; straw, 2 tons per acre; seed sown, 4 to 7 bushels per acre; grain and straw good quality. *Harvest*—Began at the usual time; cutting was general during the first week of September; weather favourable and crops rapidly secured in good condition; some instances of heating in stacks reported. *Hay*—Good in quantity and quality, both ryegrass and clover; 2 to 3 tons per acre. *Meadow Hay*—Meadows mostly grazed, not much kept for hay; crops average. *Potatoes*—Better than last year, 4 to 5 tons per acre; tubers big and dry; blight reported from several districts about the second week of August; no reports of new varieties planted. *Turnips*—Average crop; 25 tons per acre; braided well; no resowing necessary. *Insects*—Some fields showed evidence of grub; no other damage reported. *Weeds*—Prevalent in most crops; charlock, thistles, and spurrey most abundant; damage not greater than usual. *Pastures*—Of average growth and quality; similar to last year. *Live Stock*—All thrive and made good progress on pastures; cattle and sheep generally free from disease. *Clip of Wool*—Average in quantity and quality.

ORKNEY. *Wheat*—None grown. *Barley*—30 to 40 bushels per acre, and 20 to 30 cwt. straw per acre; the crop about average and quality good. *Oats*—Owing to exceptionally good weather the yield of grain was above average; 25 to 30 bushels per acre on the poorer upland farms; 50 to 60 bushels on the better land; seed sown, 4 to 8 bushels per acre according to variety. *Harvest*—Started about the usual time, and with scarcely any delay on account of weather, cutting was completed in record time; some slight deterioration set in later, but the crop was secured in first-class condition. *Hay*—About average; 20 to 40 or even 50 cwt. per acre; the weather was good during harvesting, and the crop was secured in good condition. *Meadow Hay*—Average, and secured in good condition. *Potatoes*—Considerably below average; early varieties were attacked by blight fairly early, and as early and late varieties were generally planted together the disease in many cases ruined the later crops completely; returns varied widely from 3 to 4 tons up to 8 to 10 tons per acre. *Turnips*—Estimated at slightly less than average; continued wet weather in May and June made the preparation of the land difficult; braided well, and no resowing was necessary. *Insects*—No serious damage reported. *Weeds*—Charlock present in profusion in some areas and yields were undoubtedly reduced; trials with the new product known as "Omega" were 100 per cent successful. *Pastures*—Generally were excellent, growth being considerably above average. *Live Stock*—Did very well; no disease reported amongst cattle and sheep. *Clip of Wool*—Average.

SHEPHERD. *Wheat*—None grown. *Bere*—Slightly below average, especially in bulk of straw; grain, 12 to 14 cwt. per acre; straw, 13 to 14 cwt. per acre; crop slightly inferior to that in 1944, mainly due to dry season in case of light sandy soils; seed sown, 2 to 3 bushels per acre. *Oats*—Average; grain, 9 to 11 cwt. per acre; straw, 15 to 17 cwt. per acre; quality of both grain and straw was very good, but both slightly

inferior to previous year ; seed sown, 4 to 6½ bushels per acre. *Harvest*—With very good season crops ripened quickly, and harvesting commenced ten to fourteen days earlier than usual ; generally obtained in good condition, though with later-cut crops difficulty was experienced through lack of drought. *Hay*—15 to 16 cwt. per acre ; slightly less than in 1944, though quality possibly rather better, especially with regard to clovers. *Meadow Hay*—Definitely inferior to that of 1944 ; in some districts very poor, possibly due to dry season ; average yield, approximately 10 cwt. per acre. *Potatoes*—5 to 5½ tons per acre ; yield and quality also better than last year ; blight more prevalent than for number of years ; disease began first week in August ; no new varieties planted ; the first year that stock seed potatoes were grown in Shetland. *Turnips*—Yield slightly less than in previous year ; 12 to 13 tons per acre ; braided fairly well, and one sowing was generally sufficient. *Insects*—Damage caused by cabbage W.B. caterpillar widespread, possibly worst ever experienced ; damage by carrot and cabbage root flies similar to last year, but turnip root fly in lighter soils troublesome and appeared to be increasing ; grub in oats not so prevalent as in previous year. *Weeds*—Spurrey, chickweed, and dead-nettle fairly troublesome ; very good results obtained in trials with C.L.C. ; damage average. *Pastures*—For growth and quality were rather better than last year. *Live Stock*—Throve well ; cattle and sheep generally were free from disease. *Clip of Wool*—Quality, good ; yield, average.

THE WEATHER OF SCOTLAND IN 1945.

By W. A. HARWOOD, D.Sc., F.R.S.E.

THIS report consists of (1) a general description of the weather from month to month, and (2) a selection of rainfall returns in which each county of Scotland is represented by one or more stations. Temperature readings, unless otherwise stated, are from thermometers exposed in the regulation "Stevenson Screen."

JANUARY.

In 1945 January brought a reversion towards the cold conditions of 1940 to 1942 in contrast with the exceptionally mild commencement of 1944. It was the third coldest January for half a century—colder than that of 1942. There were severe snowstorms in the third week, and totals of rainfall reached two and a half times the normal at places in the east of the country. Good aggregates of sunshine were recorded, however, especially at places in the south-west. There was an exceptionally severe gale on the 18th, with gusts of about 100 m.p.h. Much damage occurred on the east coast.

The mean temperature for the whole country was well below normal. In most places the deficit was 6° or 7° F., and at Achnashellach (Ross-shire), with a mean temperature of 30·0, it was 9·3 degrees. Except on the first two days, and again on the 16th-17th and the 30th-31st, weather was cold. A rapid thaw set in on the 30th. The highest reading of the month was 53 degrees at Alness on the 2nd. Places in Shetland, the Hebrides, and near the Moray Firth reached 52 degrees on the 1st and 2nd. The coldest spell was from the 23rd to the 29th. At Dalwhinnie frost persisted throughout the 24 hours from the 19th to the 29th inclusive, and 3 degrees below zero Fahrenheit (35 degrees of frost) was registered there on the 26th. Braemar and Balmoral had 33 degrees of frost on the 27th and 29th respectively. Ground frosts occurred every night, the lowest temperature recorded being 8 degrees below zero at Braemar on the 27th.

The total fall of rain and snow was much greater than the average along the east coast, but, on the whole, less than the average over the western half of the country. Gordon Castle,

Aberdeen, North Berwick, and Marchmont had about two and a half times their normal amounts and broke their previous records. Snow fell on 23 days in the Aberdeen district, and Edinburgh had snow on 14 days. During the third week severe storms brought transport to a standstill, with snowdrifts of 10 to 20 feet deep in various parts of the north and west. The effects were severe even in the Western Isles.

For the country as a whole the month was a sunny one, but the distribution was not uniform, and while the west and south-west enjoyed bright weather, some parts of the east coast were very dull. In the south-west Eskdalemuir's total of 81 hours was over double the average. Turnberry's total of 79 also broke its previous records. On the other hand, Banff and North Berwick had only 27 hours each, and Fort Augustus, with its large cut-off by the hills, had only 15 hours.

FEBRUARY.

Whereas January was the third coldest January for 50 years, February was the third mildest February for 60 years—only the corresponding months of 1903 and 1943 equalled it. Weather was very wet in the west, but sunny in the east. Gales on the 24th and 28th caused some damage both on the coasts and inland.

Mean temperature was above normal everywhere, the excess being in general about 4 degrees. Edinburgh had its mildest February since observations began at the Royal Observatory in 1896. After a rather cool first week, temperatures rose and remained well above the seasonal average. The warmest periods were from the 17th to the 19th and the 26th to the 28th. Nairn reached 62° F. on the 18th, and Aberdeen had 60 degrees on the 27th. The coldest nights were those of the 3rd and the 11th, Dalwhinnie having 13 degrees of frost on the 3rd, and Balmoral 14 degrees (18° F.) on the 11th. Ground frost was fairly widespread in the first fortnight, the lowest readings being 10° F. at Peebles and 12 at Dalwhinnie on the 3rd.

For the country as a whole the month was wetter than any February since 1926, and many stations in the west had rain every day. In several scattered areas the total was twice the average. Kilmarnock, with 6½ inches, had its largest rainfall for this month since observations began in 1901. Kinlochquoich had 23·74 inches. On Deeside, however, and thence up the east coast to Wick, rainfall was below the average. Balmoral had only 1·29 inches or half its usual amount. Light snow fell locally on 19 days.

The month was a bright one on the Aberdeen-Banffshire coast, stations there reporting 30 to 40 hours more than usual. On the other hand, along the Great Glen totals were about this amount below normal, and parts of Argyll also experienced a dull month. Craibstone, near Aberdeen, recorded the largest total (112 hours), and Banff had 109. Fort William, however, registered only 17 hours, Onich 23, and Benmore (near Dunoon) 26 hours.

MARCH.

This month was even more unseasonably mild than February. It was the second mildest in 90 years. Weather was again generally dull and wet in the west, but fine and dry in the east. Gales were less numerous than usual for March. The most severe one, on 31st, affected a great part of the east coast as well as the Western and Northern Isles, but was not very severe.

Mean temperature was exceptionally high over the whole country, and at a number of stations in the north-east, the excess over the average was more than 7 degrees. After three cold days at the beginning of the month mild weather persisted throughout. Two days, the 23rd and 24th, were outstanding for summer-like warmth. On the 23rd Glasgow reported 71 degrees, and parts of Edinburgh 72, and on one or other of the days Nairn, Fort Augustus, Dunfermline, Dunbar, Renfrew, Prestwick, and Kelso had 70 degrees. In the cold spell at the beginning of the month the lowest screen temperatures were 19° and 21° F. at Eskdalemuir and Wolfelee (Hawick) respectively on the 3rd. There were fairly severe ground frosts on 3 nights and slight ones on 20 nights. Dunfermline registered a surface temperature of 15° F. on the 3rd.

The month was very dry in all eastern districts and only slight showers occurred there until the 26th. About half the month's rain fell in the last five days. Over large areas between Moray Firth and the Tweed the totals were well under one inch. Many places had about a quarter of their usual amount. In the south-west and north-west rainfall approached more nearly to the average, and in the Clyde area and the Western Highlands it was above average. Snowfall was limited to showers and was nowhere heavy.

Sunshine was abundant along the east coast, rather less than usual in central districts, and definitely deficient in the west and north-west. Arbroath recorded 129 hours during the month, and other stations in the same area approached this figure. On the other hand, in the Great Glen and the Western Isles and at Rothesay and Ruthwell the totals were from 30 to over 45 hours below normal. Fort William had a total of only 55 hours.

APRIL.

April was mainly a dry month, and sunny except along the Great Glen and in the north-west. Conditions varied from summer-like warmth in the third week to severe cold at the close of the month. There was one moderately severe gale (on the 1st). It affected most of the country.

Mean temperature was above the average, but the outstanding feature was the range of temperature rather than its mean value. From the 5th to the 20th conditions were mainly warm. The warmest day was the 19th when Edinburgh and Penicuik recorded

73° F., Perth, Peebles and Kelso 72, and many places in the east and south 70 to 71. On the 21st cooler weather set in, and on the 30th temperatures were exceptionally low. Kilmarnock reported 19 degrees, and Dungavel and Braemar 20. The range of temperature between the warm and the cold spell was greatest at Peebles, which had a maximum of 72 and a minimum of 22, but the range at many other places—namely, 45 degrees—was not far short of this. Ground frosts at the end of the month were severe. Dunfermline and Dunoon both reported 20 degrees of frost, and various other places approached this figure.

Falls of rain and snow were below normal over most of the country. Stations in general had about three-quarters of their usual amount, but some inland places represented by Braemar, Blair Atholl, and Fort William did not exceed half. Only a few scattered areas—for example, the neighbourhoods of Glasgow and North Berwick in the south, and parts of Sutherland in the north—reached or slightly exceeded their average. Most of the rain fell in the first week, and from the 10th to the 14th. Snow was reported on ten days, and was widespread from the 27th to the 30th.

The month was sunny over the greater part of Scotland. The southern half of the country enjoyed from 40 to 50 hours more sunshine than usual. Daily amounts between the 18th and the 24th reached nearly 14 hours in favoured places. Turnberry reported 201 hours during the month, and a number of places exceeded 180 hours. In the regions of the Great Glen and the Hebrides, however, some stations had about 40 hours less than usual, totals being about 110 to 115 hours.

MAY.

May was a month of extremes like April. It is remembered more for the damaging frost of the 1st to the 5th than for the warm spell of the second week. It was also a wet month on the whole—the wettest since 1925. Nevertheless, sunshine records were good in the north-east and fairly good in the Western Isles. There were several gales, but none of outstanding violence.

Mean temperature was generally about average or slightly above average. Individual readings, however, extended over a range of 50 degrees. The cold spell of late April persisted until the 5th of May. The lowest recorded temperatures at this time were 20° F. (12 degrees of frost) at Dalwhinnie on the 4th, and 22 to 23 degrees at Wolfelee (Hawick), West Linton, and Eskdalemuir. The second week brought a warm spell in which the warmest days were the 11th and the 12th. Kilmarnock and Dungavel registered 77 degrees on the 11th and 12th respectively, and on the latter day places as far apart as Fort Augustus, Kirkcaldy, and Edinburgh had 75 degrees. Ground frosts were very severe in the cold spell. Dalwhinnie, for example, reported 13° F. (19 degrees of frost) on the 4th.

Rainfall was much above normal. More than twice the average

amount occurred in Shetland, parts of central and east Scotland, the Clyde area, and the Borders. The excess was least in the customary wet area of the west, and, in fact, some places there—for example, Arisaig—had rather less rain than usual. Snow and sleet fell generally in the course of the early cold spell, some places in the hills being cut off by drifts for a few days. Thunderstorms were reported on 20 days, the highest monthly frequency since July 1940.

The north, north-east, and parts of the Islands had abundant sunshine, while the area represented by Stirling, Cardross, and Benmore (Dunoon) was relatively dull, with totals in the neighbourhood of 120 to 130 hours. Tiree headed the sunshine list with 226 hours; it was, nevertheless, 11 hours short of its normal. Inverness, Nairn, Banff, and Craibstone had some 20 to 30 hours more than usual, their totals being between 190 and 210 hours.

JUNE.

June, on the whole, was wet and dull. There was, however, a fine warm spell from the 18th to the 24th, and some places in the east had good records of sunshine. Hail caused local damage to fruit. Gales were reported on 5 days, but none were severe.

Mean temperature was rather above normal except at a few places in the west. In parts of the north-east the excess exceeded 2 degrees. Rather cool conditions prevailed until the 18th, but the succeeding week was fine and warm. The warmest days were the 19th and 20th, on the latter of which Colmonell reported 80 degrees. Ruthwell touched 79 on both days, and Prestwick on the 20th. In the coolest spell, from the 3rd to the 5th, temperature at Balmoral and Braemar just reached freezing point and was only one degree higher at Dalwhinnie. There were slight ground frosts at high levels on four nights.

Rainfall, which was frequent and heavy in the first fortnight and the last week, exceeded the normal for the month in nearly all parts. The only places with slight deficits were Edinburgh and Kelso. In and to the west and north-west of Glasgow the monthly totals were more than twice as great as usual. At Dalwhinnie and Achnashellach there was rain every day for the 26 days from 24th May to the 18th June. Snow fell in the Cairngorms and Wester Ross on the 16th, and hail was reported on 6 days.

Sunshine totals were generally good in Fife and along the coast from Aberdeen to Inverness. They were fairly good also in the Western Isles, but the month was rather cloudy over most of the country. Representative places in the east, headed by St Andrews with 218 hours, had monthly totals exceeding 200 hours, and Tiree registered 199 hours. The smallest amounts were in the neighbourhood of the Great Glen, where Fort Augustus had only 110 hours and Onich only 111.

JULY.

Over the country as a whole this was the warmest July for eleven years. Weather was unsettled, with exceptionally frequent and severe local thunderstorms, but less wet than usual in the centre, north-west, and the Borders. Sunshine totals were in the main below average. There was only one moderate gale.

Mean temperature was well above normal everywhere. The warmest spells were at the beginning and at the end of the month. In these, temperature reached 75 degrees or more at many places. The hottest days were the 5th and the 31st, when Gordon Castle and Stirling respectively recorded 80 degrees. Temperatures of 78 to 79 occurred at Logie Coldstone on the 5th, Glasgow on the 30th, and Edinburgh on the 5th, 30th, and 31st. Four clear nights on 2nd, 7th, 25th, and 27th gave some low temperatures at the higher levels, Logie Coldstone, for example, on the 3rd having a reading of 35 degrees, while Dalwhinnie and Balmoral had 36. No cases of ground frost were reported however.

In most parts there was little rain during the first and last weeks, and, although the intervening period was decidedly wet, the total fall for the month was below average in a large part of central Scotland, the north-west, and the Borders. Only in Skye did the amount reach about 50 per cent above average. Thunderstorms, some of exceptional severity and long duration, gave heavy falls of rain, exceeding 2 inches in Skye, Argyll, Perthshire, and Aberdeenshire. They were widespread on the 1st, 9th, 14th to 16th, and 19th, and caused damage by flooding in the Gourrock and Pitlochry districts.

Sunshine was brilliant in the first week and the last nine days, but during the intervening period it was only intermittent, and though the month's totals exceeded the average in Fife and at Arbroath, Edinburgh, and Abbotsinch (Renfrew), they were below average elsewhere. As in June, St Andrews, with 193 hours, headed the list. Leuchars and Dunbar had 187 and Arbroath 181 hours. In the north-west and the Hebrides records were poor; the total of 86 hours at Stornoway, for example, was 59 hours below normal.

AUGUST.

In general August was warm, sunny and dry, with, however, some heavy local thunder rain. Two gales occurred, but were not severe.

Mean temperature was generally above normal, the excess being over 2 degrees in the Clyde, Stirling, and Fort William areas. The warm spell of late July continued into August, and shade temperatures rose to 80 degrees or more during the first three days. The warmest day was the 1st and the highest reading reported, 83 degrees at Stirling. Other high readings on this day were 82 in Edinburgh, 81 in Glasgow, and 80 at Perth. Similar

high temperatures were reached again at Ruthwell on the 11th and Kilmarnock on the 14th. In the third week and towards the end of the month nights were rather cool. The lowest screen temperature, 36 degrees, was reported from Glenlee on the 17th and Braemar on the 19th. Slight ground frosts occurred locally on the 23rd and the 31st.

Rainfall was below average in most parts. Large areas north of the Solway and from the Clyde to Argyll and Perthshire had less than half their usual amount. At some places in the north-east, however—for example, Montrose, Aberdeen, Gordon Castle, and Banff—there was about 50 per cent more rain than usual. On the 6th, 15th, and 23rd exceptionally heavy falls occurred in several districts. A number of individual falls exceeded 3 inches. The River Deveron rose 15 feet and caused much damage to live stock, standing crops, bridges, and roads. There was also extensive flooding at Perth.

At many places in the south-west and west the duration of bright sunshine was 50 to 60 hours above normal, but in Shetland it was much below normal, and in parts of Inverness-shire and Berwickshire there was a slight deficit. Dumfries, with 199 hours, recorded the largest total. Other stations in the south-west had amounts exceeding 180 and 190. Lerwick, however, measured only 81 hours (36 below normal), and Inverness and Marchmont 128 and 139 respectively.

SEPTEMBER.

This was the fourth mildest September for half a century. It was fine until the 9th, but dull and wet thereafter, except in Shetland. There was a violent gale which affected a great part of the country on the 21st-22nd and caused a good deal of structural damage. It was, however, almost the only gale reported.

Mean temperature was above normal for the eighth successive month. Notably warm days occurred from the 1st to the 4th and on the 11th and 12th. In the first of these spells Fortrose reported 79 degrees on the 3rd and Alness and Kilmarnock 77 degrees. In the second, Edinburgh had 76 degrees on the 11th and Peebles 71 on the 12th. Nights were exceptionally mild, and no station at all reported screen frost—a record for the last 75 years. The lowest temperature was 33 degrees. This occurred at Logie Coldstone on the 1st and at Dungavel on the 25th. Very slight ground frosts were experienced on six nights.

Rainfall was above normal except at a few scattered places in the north and north-west, including Lerwick, Inverness, Nairn, Ullapool, and Arisaig. Glasgow had nearly double its usual amount, and Glen Afton (Ayrshire) and Blair Atholl more than double. Some places in the west had only one dry day (the 24th) in the last three weeks. There were severe thunderstorms on the 12th and the 20th accompanied by very heavy rain and hail in places.

While there was a marked lack of sunshine in most parts, Lerwick had its sunniest September for 17 years, Banff and Gordon Castle slightly exceeded their averages, and Arbroath and Stornoway respectively reached and almost reached their average. The highest aggregate of the month was 137 hours at Arbroath, followed by 133 at Banff and Dunbar. On the other hand, Eskdalemuir had only 73 hours (the lowest recorded there since 1910), and Perth's total of 88 hours was 42 below normal. Other low totals of 80 or less were reported from Benmore (Dunoon), Fort William, Dalwhinnie, and Cardross. Glasgow had only 82 hours.

OCTOBER.

October was very mild, quiet, and, for more than half the month, sunny. Nevertheless, rainfall, which occurred mainly in the last ten days, exceeded the average over most of the country. Winds rose to gale force on only 7 days—an exceptionally small number for this season.

Mean temperature was well above normal, and for the country as a whole the month was the mildest October since 1921. The warmest period was in the first week. At this time shade temperatures of 65 to 70 occurred widely. The highest reading of the month—namely, 71—was recorded at Balmoral on the 3rd and at Kilmarnock on the 5th. Temperatures were also high on the 15th, 17th, and 18th, Braemar registering 70 degrees on the 18th. Nights were remarkably mild, and even stations above the 1000-foot level had very little frost. The lowest screen temperature (26 degrees) was registered at Braemar on the 7th and also at Eskdalemuir on the 14th. There was slight ground frost on 15 nights.

During the first three weeks little rain fell except from the 8th to the 10th, but this dry spell ended on the 20th and thereafter rainfall was heavy enough to give monthly totals above the average over most of the country. In parts of Angus and the Clyde basin the amounts were nearly double the average. The areas in which rainfall remained somewhat below normal were Deeside and the west, from Mull to Cape Wrath. There was considerable flooding in the Motherwell district, on Deeside, and in Easter Ross and Fife.

Sunshine totals were, in general, average or rather above average. Most places on the east coast from Alness to Dunbar had 100 hours or more. Turnberry on the west coast and Marchmont inland also reported this amount. Craibstone headed the list of aggregates with 115 hours, followed by St Andrews with 109. Onich, Fort William, and Fort Augustus, with totals of 94, 90, and 80, had respectively 35, 27, and 12 hours more than usual. Lerwick had only 29 hours (42 below average), and the month was rather dull in Sutherland, Caithness, and near Glasgow.

NOVEMBER.

The outstanding feature of November was its dryness. It was the driest November on record in the Western Highlands and many other parts. It was also exceptionally mild, and the semi-permanent snow-bed of Ben Nevis disappeared for the first time in 30 years. Weather was bright in the north-west, but rather dull elsewhere.

Mean temperature was above average generally, and at Greenock, Fort William, Leuchars, and Marchmont the excess was 4 degrees or more. The first week was specially mild, 55 to 60 degrees being reported widely. The highest reading of the month—namely, 61—occurred at Dumfries on the 1st and at Craibstone on the 4th. Weather was cool from the 12th to the 17th and again on the 26th and 27th, a temperature of 17 being reported from Dalwhinnie on the 13th and of 20 from Braemar and Logie Coldstone on the 12th. Ground frosts occurred in places on 22 nights, the lowest surface temperature being 15 degrees (17 degrees of frost) at West Linton on the 12th.

In most parts rainfall was about a quarter of its usual amount; only in Shetland and locally on the east coast did it reach even half the normal. In Galloway, parts of the Clyde area, and at Stirling and Nairn it was barely a tenth of the average. Nairn, with a total of 0·15 inch, had its driest November since observations began in 1866. Many other places also had their driest November on record. Light snowfall was reported on the hills at Braemar and Glencoe on the 11th and on Ben Nevis and Ben Lomond on the 20th.

It was a dull month for most of the country, and especially so in the east and south-east where the sunshine aggregates were 30 to 35 hours below normal. In Shetland and the Hebrides, however, Baltasound with 41 exceeded its normal by 14, Dun-tuilm had 65 hours, and Tiree 64 or some 18 hours above normal. A few places on the mainland—namely, Turnberry, Forres, and Carluke—also had rather over 60. On the other hand, Braemar recorded only 20, and Fort Augustus, Aberdeen, Peebles, Marchmont, and Greenock were all below 30.

DECEMBER.

December was stormy, rather mild, and mainly dull. Rainfall was frequent rather than heavy, except in the north-east. There were 19 days of gale, an exceptionally high frequency, and four gales were severe.

Mean temperature was, in general, rather above normal, but day to day temperatures were rather variable. There were two noteworthy mild spells. The highest temperatures were reported in the first of these at the beginning of the month—Fort William, Onich, and Marchmont, for example, recording 57 degrees on the

1st. In the second spell, from the 15th to the 17th, temperatures again exceeded 50 degrees in places. The lowest temperatures occurred mainly at the end of the second week, but weather was cold again on the 21st and at the end of the month. On the 14th Eskdalemuir registered 17 degrees (15 degrees of frost), and Peebles and West Linton 19 degrees. In the cold spell towards the end of the month iced roads caused a number of accidents. Ground frost was frequent, but in general not severe for the season. The lowest reading was 12 degrees (20 degrees of frost) at West Linton and Dumfries on the 14th.

The weather was showery. Many places in the west recorded rain almost every day, but in spite of this had less than usual for December. In the east, however, from Duncansby Head to the Tay and over much of central Scotland, rainfall was above average. Braemar and Dundee had over double their normal amount, and Wick, Gordon Castle, and Balmoral nearly double the normal. Light snowfall was reported locally on 9 days.

Sunshine was average or rather below average in most parts, but several districts in the south-west and the east were favoured with more than is usual in December. Carlisle had 47 hours and Turnberry 44 (13 hours above normal). Edinburgh, Penicuik, and Longforgan had 43. At the other end of the scale several stations recorded under 20 hours. Inverness, with a total of 18 hours, was 16 below average; Braemar and Lerwick had only 14 hours; and cut-off by neighbouring hills, together with the prevailing cloud, reduced sunshine at Fort William to the exceptionally small total of 5 hours.

RAINFALL (MEASURED IN INCHES) FOR 1945

AT SELECTED STATIONS IN SCOTLAND.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Shetland—Lerwick	3.69	4.19	2.76	3.52	4.32	2.07	1.88	3.09	2.90	3.57	3.00	4.56	39.55
Calthness—Wick	3.67	1.93	1.15	1.76	2.53	2.87	2.91	2.33	2.50	3.74	1.25	5.41	32.05
Sutherland—Melvich	3.03	2.97	1.63	2.63	3.17	2.36	2.43	1.83	3.45	4.60	2.77	5.87	36.94
Laig	3.81	4.73	2.68	2.57	3.55	3.38	2.59	3.59	4.36	3.97	1.72	4.83	41.78
Ross and Cromarty—													
Fortrose	2.82	2.48	.97	1.30	2.73	3.02	2.25	2.09	2.15	4.08	.28	2.75	26.92
Lochbarron	7.70	8.46	8.03	4.50	4.17	5.71	5.34	4.32	7.02	3.78	1.82	5.70	66.53
Stornoway	3.83	4.57	2.89	2.25	2.87	3.12	2.74	2.11	5.26	2.87	.93	4.49	37.93
Inverness—													
Inverness	2.47	2.24	1.27	1.18	2.33	3.25	2.44	3.09	2.26	3.69	.31	2.33	26.86
Fort William	5.32	14.34	8.86	2.34	5.74	7.18	3.03	3.82	8.60	5.02	.72	6.54	71.51
Glenquoich	9.35	20.22	18.30	4.03	8.19	10.42	3.32	5.08	12.95	5.04	2.05	9.81	104.83
Portree	7.16	7.52	6.28	3.81	4.53	6.30	4.67	3.52	7.41	4.02	1.63	5.87	62.22
Nairn—Nairn	2.67	1.55	.54	.96	2.20	2.63	1.93	2.67	1.53	3.14	.15	2.11	22.08
Moray—Gordon Castle	5.02	1.64	.70	1.18	3.62	2.63	3.16	4.90	2.53	3.31	.66	4.70	34.04
Aberlour (Wester													
Elchies)	4.10	1.25	.64	1.60	2.84	2.56	2.63	5.74	2.78	3.23	.58	5.61	39.56
Banff—Banff	4.13	1.77	.84	.99	2.54	2.51	2.72	4.96	2.45	5.68	.82	4.45	30.86
Aberdeen—Peterhead	3.17	1.77	.55	1.14	2.53	2.08	2.09	3.83	1.92	4.00	.76	4.38	25.82
Aberdeen (King's Coll.)	5.31	1.73	.61	1.32	3.99	2.51	3.01	4.06	2.37	3.97	1.25	4.41	34.54
Balmoral	5.67	1.29	.61	1.38	3.75	2.47	1.76	3.18	3.49	3.49	.95	6.74	34.78
Kincardine—Fordoun	2.75	2.48	.38	1.29	5.19	2.65	3.50	4.89	4.16	4.81	1.86	5.95	39.76
Angus—													
Montrose (Asylum)	4.07	2.02	.84	1.09	4.26	2.14	2.76	4.03	3.81	4.71	1.36	4.42	35.51
Dundee	3.64	2.11	.84	1.40	4.02	2.58	3.35	3.25	3.46	5.21	1.19	5.72	36.77
Glamis Castle	4.40	2.29	1.01	1.17	4.84	2.74	3.25	2.85	3.94	4.20	1.41	5.98	38.38
Brechin	4.06	2.50	1.04	1.07	4.92	3.23	2.83	3.67	3.12	5.53	1.77	5.66	39.40
Perth—Blair Castle	3.81	4.16	2.03	1.12	5.39	2.93	3.82	1.65	5.46	3.73	.94	5.52	40.06
Orfio	4.38	5.96	2.55	2.14	4.84	3.95	3.82	2.01	5.30	5.86	.65	4.88	46.34
Perth	3.35	3.28	1.30	1.30	4.19	2.78	2.41	2.39	3.67	4.33	.80	4.26	34.08
Fife—Cupar	3.41	2.69	1.24	1.24	4.08	2.27	3.25	3.24	3.26	4.15	.88	3.54	33.25
Kirkcaldy	2.94	2.54	1.69	1.39	3.60	2.30	3.37	2.26	4.10	3.87	.81	1.81	30.65
Kinross—Loch Leven	2.60	4.94	2.23	1.75	4.37	3.66	3.47	2.12	4.53	4.61	.86	3.38	39.32
Clackmannan—													
Tillicoultry	3.20	4.51	2.09	1.35	4.57	3.20	3.56	2.88	6.15	5.16	.37	3.48	40.52
Argyll—Gruline (Mull)	4.36	9.62	6.22	2.88	5.55	6.72	4.52	2.98	8.57	6.57	1.75	7.86	67.60
Oban	5.51	9.02	4.79	2.12	4.31	4.92	3.68	2.67	7.78	5.26	.35	4.22	54.63
Glencoe Gardens	5.00	13.08	6.81	2.35	6.86	7.44	3.38	3.68	9.10	5.46	.62	9.45	73.03
Inveraray	4.44	13.95	8.54	3.68	5.60	7.59	4.22	5.53	9.69	7.62	1.15	7.79	78.08
Bute—Rothesay	3.79	7.38	3.75	2.84	3.81	4.95	2.68	2.35	5.95	6.12	.92	6.01	50.55
Stirling—Stirling	2.94	5.70	2.70	1.70	4.57	3.52	3.64	1.83	4.26	5.30	.24	3.31	39.71
Dumbarton—													
Garlochhead	5.02	11.07	6.74	3.72	5.45	5.26	5.24	2.11	8.04	8.45	.72	8.87	70.69
Helensburgh	4.32	8.49	4.09	2.63	4.94	4.63	4.73	2.69	6.38	6.67	.84	5.90	50.31
Renfrew—Greenock	4.43	9.38	4.79	2.16	5.11	4.19	4.16	2.41	6.06	7.23	.53	5.84	56.29
Paisley	3.42	6.49	3.30	2.42	5.21	3.95	3.83	1.83	4.69	6.78	.37	3.91	46.20
Ayr—Kilmarnock	3.95	6.51	2.98	1.64	4.07	4.38	3.81	2.28	4.29	6.01	.39	2.76	43.03
Prestwick	3.72	4.83	2.38	1.51	3.81	3.59	2.44	1.68	3.96	4.26	.30	2.31	34.79
Muirkirk	3.91	7.25	3.35	2.04	4.67	4.52	2.95	1.02	6.06	4.45	.76	3.61	46.39
Ballantrae	3.98	4.18	2.04	1.31	3.08	3.39	2.35	1.34	4.42	3.01	.48	4.68	34.26
Lanark—													
Glasgow (Botanic Gdns.)	2.59	5.35	2.51	2.15	4.10	3.67	3.40	1.68	4.25	5.21	.40	3.01	38.32
Douglas (Newmains)	3.50	5.83	2.92	1.59	4.65	3.68	2.70	1.44	4.91	4.07	.53	3.13	40.85
Biggar	2.99	3.82	2.35	1.12	4.47	2.84	2.58	1.06	5.20	3.15	.13	2.09	31.80
Linlithgow—													
Houston House	3.40	4.53	2.09	1.53	4.20	2.91	3.16	2.90	5.55	4.17	.91	2.53	37.88
Midlothian—													
Edinburgh (University)	2.96	3.48	1.03	1.12	4.08	1.78	2.20	3.00	3.15	3.67	.33	2.34	29.14
Oxenford Castle	3.94	2.48	.98	1.07	4.51	1.46	1.79	3.62	2.96	2.65	.48	2.01	27.95
Haddington—													
North Berwick	4.40	1.51	.79	1.39	4.11	1.87	2.33	2.78	3.05	3.50	.75	1.88	28.36
West Hopes	4.78	3.18	.79	1.23	4.08	1.59	2.99	5.73	2.84	3.22	.68	3.16	34.32
Berwick—Duns Castle	6.77	1.97	.56	1.35	4.05	2.57	2.52	4.12	3.16	4.84	.91	2.03	34.85
Marchmont	6.02	2.10	.63	1.25	4.35	2.77	2.95	3.06	3.24	4.41	.85	1.95	33.58
Peelies—West Linton	4.49	4.30	2.37	1.61	4.17	2.96	3.07	4.09	4.93	4.44	.71	2.49	39.63
Selkirk—Caddonfoot													
(Fairlie Gardens)	4.22	2.62	1.17	1.19	3.75	2.44	2.24	1.42	3.94	4.36	.63	2.48	30.46
Roxburgh—													
Kelso (Broomlands)	4.25	1.88	.61	1.12	4.30	1.97	1.92	2.16	3.10	3.21	.81	1.66	27.04
Wolfelee	4.14	3.00	1.49	1.42	4.11	2.69	2.22	2.27	3.09	3.33	.54	2.04	30.84
Dumfries—Dumfries	3.22	4.59	2.51	2.37	4.83	3.50	2.80	1.13	4.46	4.31	.25	3.21	37.18
Langholm	4.69	6.42	3.82	3.27	5.73	4.49	3.79	2.85	6.05	5.33	.36	4.44	51.24
Bedalemuir	6.36	8.25	4.82	3.15	6.33	5.00	3.93	2.00	6.97	6.16	.63	3.47	57.07
Kirkcudbright—Castle													
Douglas (Corbillion)	3.43	5.29	3.12	1.91	5.34	3.70	3.89	1.21	4.61	5.46	.31	4.03	42.30
Carrpalm (Cornharrow)	4.87	6.98	4.04	3.08	5.24	4.92	5.42	2.09	5.60	6.55	.43	6.68	55.90
Auchencarr	4.40	5.73	3.24	2.48	5.20	4.07	3.75	1.60	5.27	6.06	.39	3.56	45.70
Wigtown—Monreith	4.72	5.23	1.65	2.31	3.01	3.07	2.63	1.87	3.00	4.47	.36	4.36	36.68

AGRICULTURAL STATISTICS.

TABLES 1 TO 8.

THE detailed information regarding the acreages under crops and grass, yields per acre, total produce and numbers of live stock for each county of Scotland, which formerly appeared in Tables 1 to 8, is not yet available for the years 1939-45. The total figures for the whole of Scotland for these years, however, are given in the Tables appended to the article, " Scottish Agriculture during the War," by David Marshall, M.C., M.A., B.L., on pages 1 to 77.

[TABLE No. 9.

TABLE NO. 9.—QUANTITY AND VALUE OF CORN, &c., imported into the United Kingdom
in the years 1938-1945.

[From Trade and Navigation Returns.]

(*) Quantities.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
Grain (other than grain for sowing)—	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Wheat	101,628,356	106,074,394	115,081,029	107,863,540	69,743,732	65,125,557	56,474,411	71,002,344
Barley	19,875,622	13,739,923	9,146,255	1,270,772	34	..	..	2,085,329
Oats	1,575,721	1,468,199	1,634,396	1,929	688	..	..	2,089,334
Maize	67,581,046	46,398,673	41,581,345	13,457,619	2,622,962	1,299,353	2,341,246	10,210,633
Rice, husked or cleaned	2,671,216	2,861,817	3,825,625	3,572,290	1,068,597	2,622,648	836,849	503,624
Peas, not fresh	1,945,811	1,722,177	906,868	743,037	538,678	876,697	508,618	672,824
Beans, not fresh	955,591	980,448	2,026,677	2,415,882	424,077	512,916	921,341	648,483
Lentils	280,673	251,336	389,089	636,171	183,005	48,906	144	25
Other kinds of grain	140,962	65,183	908,830	..	298	1,935	1,966	20,273
Products of the milling and allied industries—								
Wheat products—								
Meal and flour	7,676,749	7,333,093	11,547,034	14,157,992	7,487,782	14,350,678	15,830,971	10,857,417
All other descriptions	331,820	316,143	341,377	76,872	21,516	234	2,602	37,908
Oat products	596,753	610,035	945,124	867,745	625,006	1,173	187,122	763,072
Maize products	3,850,011	5,163,102	2,993,709	1,389,407	1,064,677	875,973	943,324	762,750
Flour and meal of other cereals, except barley	76,707	118,356	18,866	66,138	200,717	994,177	248,209	14,576
Farinaceous substances, for use as food not elsewhere specified	698,859	871,002	1,145,317	611,697	159,151	19,625	25,136	12,722
Other articles under grain and flour for food	270,753	285,309	250,037	3,342	34,799	62,113	2,719	2,036
Total of Group	200,154,650	188,269,190	192,741,478	147,240,423	84,175,684	86,791,985	78,324,558	99,693,350

TABLE NO. 9 (continued).—QUANTITY AND VALUE OF CORN, &c., imported into the United Kingdom in the years 1938-1945.

[From Trade and Navigation Returns.]

(ii) Values.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
	£	£	£	£	£	£	£	£
Grain (other than grain for sowing)—								
Wheat	38,627,554	28,001,588	55,206,259	61,188,347	41,083,823	44,002,409	43,061,882	57,075,356
Barley	6,849,732	3,925,937	3,921,400	589,972	24	..	..	1,367,741
Oats	537,520	406,545	740,199	1,142	428	..	..	1,597,512
Maize	17,699,832	13,134,801	15,486,407	5,424,211	1,057,507	541,248	1,193,448	4,976,008
Rice, husked or cleaned	1,182,557	1,451,395	2,632,609	4,910,470	1,631,383	4,363,847	1,435,999	799,427
Peas, not fresh	1,140,915	1,079,484	997,525	724,992	646,696	1,166,911	486,331	827,610
Beans, not fresh	501,220	622,402	2,163,743	2,930,482	551,219	661,937	1,277,394	1,023,242
Lentils	125,269	120,237	365,254	483,894	151,946	60,200	152	47
Other kinds of grain	45,849	18,496	347,773	..	375	1,779	3,120	15,466
Products of the milling and allied industries—								
Wheat products—								
Meal and flour	3,979,988	2,730,718	6,724,274	10,291,003	6,003,109	12,875,353	16,221,340	11,784,587
All other descriptions	533,189	482,674	567,695	77,551	62,137	495	7,046	49,716
Oat products	772,592	803,464	1,079,137	867,850	599,784	1,038	270,159	1,031,626
Maize products	1,627,350	1,710,501	1,765,549	1,322,310	1,218,943	956,945	1,083,177	880,625
Flour and meal of other cereals, except barley	33,292	40,402	12,542	111,253	348,804	1,207,913	425,807	22,963
Farinaceous substances, for use as food not elsewhere specified	394,090	505,439	1,171,950	702,741	204,752	46,337	61,445	35,919
Other articles under grain and flour for food	367,389	412,125	498,772	3,211	49,479	123,657	3,321	3,691
Total of Group	74,418,338	55,446,208	93,681,088	89,629,429	53,610,409	66,010,069	65,530,621	81,421,536

TABLE No. 10.—SUMMARY OF TOTAL VALUES APPEARING IN TABLE No. 9 OF GRAIN AND FLOUR IMPORTED into the United Kingdom in the years 1938-1945.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
From—	£	£	£	£	£	£	£	£
Union of South Africa . . .	1,540,071	2,813,851	3,189,920	1,428,068	274,688	1,200	601	100
Southern Rhodesia . . .	208,936	14,257	134,390	124,626	..	..	..	..
Kenya . . .	194,805	217,833	92,430	225,758	1,412	28	..	..
British India . . .	1,909,975	219,009	704,882	1,145,312	303,064	123,852	8,047	9,239
Burma . . .	684,915	610,016	1,146,360	4,589,698	818,355	..	..	..
British Malaya . . .	195,024	234,888	388,215	261,493	50,012	1,687,328	449,763	171,655
Australia . . .	14,392,095	4,601,048	10,666,578	5,249,165	4,933,427	53,960,808	50,361,644	64,204,435
Canada . . .	18,592,293	15,794,899	36,459,272	60,987,691	39,723,323	56,548	49,615	83,018
Other British countries . . .	234,108	308,465	793,381	444,684	136,442	..	..	..
Soviet Union . . .	4,187,343	537,420	..	..	..	..	..	..
Denmark . . .	430,564	†	†	†	†	†	†	†
Netherlands . . .	1,461,651	†	†	†	63,476	..	..	..
Dutch East Indies . . .	148,508	129,965	257,146	179,601	†	..	..	..
Belgium . . .	1,353,536	†	†	†	†	†	†	†
France . . .	397,387	2,420,668	1,360,624	†	†	†	†	†
Madagascar . . .	114,420	148,326	359,045	15,692	129,596	121	..	53,924
Roumania . . .	1,324,500	2,297,527	1,067,033	†	†	†	..	..
Iraq . . .	991,342	904,409	1,178,090	355,546	†	..	..	..
United States of America . . .	15,602,821	6,827,601	8,261,689	6,297,872	3,330,609	7,398,768	5,432,168	6,096,749
Chile . . .	183,558	140,959	968,714	349,661	26,209	..	..	105,874
Brazil . . .	†	†	517,273	64,557	769,430	1,872,004	1,495,085	665,608
Argentine Republic . . .	8,190,189	13,250,599	21,332,793	7,708,055	3,044,494	917,471	7,730,674	10,031,869
Other foreign countries . . .	2,080,297	3,974,668	4,803,353	200,950	6,872	1,941	3,124	65
	74,418,338	55,446,208	93,681,088	89,629,429	53,610,409	66,010,069	65,530,621	81,421,536

† Imports, if any, included in the figure for "Other Foreign Countries."

TABLE No. 11.—SUMMARY OF TOTAL VALUES APPEARING IN TABLE No. 14 OF DAIRY PRODUCE IMPORTED into the United Kingdom in the years 1938-1945.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
From—	£	£	£	£	£	£	£	£
Eire	3,326,631	2,986,607	4,903,759	4,281,405	3,212,800	2,877,504	3,380,100	3,432,627
Union of South Africa	376,575	627,096	867,993	381,982	10,547	2,040	324	40,409
Australia	11,114,163	12,563,030	12,589,288	10,860,350	7,006,994	6,886,530	5,522,499	7,903,660
New Zealand	20,378,696	16,804,256	21,606,564	26,484,190	24,801,744	22,880,098	22,495,443	28,350,936
Canada	3,008,040	3,351,461	4,502,888	4,819,354	7,636,914	10,573,905	11,706,222	17,002,746
Other British countries	244,909	390,281	331,301	30,325	7,593	33,545	27,685	9,704
Finland	1,303,549	895,406	..	†	†	†	..	†
Estonia	951,001	†	..	†	†	†	..	..
Latvia	1,637,201	†	†	†	†	†	..	..
Lithuania	1,269,027	†	†	†	†	†	†	†
Sweden	1,737,371	1,511,370	370,083	†	†	†	†	†
Denmark	18,069,459	†	†	†	†	†	†	†
Poland	1,848,545	†	†	†	†	†	..	†
Netherlands	8,521,114	†	†	†	†	†	†	†
China	2,977,406	2,376,100	3,405,210	2,785,373	134,815	..	..	..
United States of America	153,862	40,684	1,611,845	14,818,297	40,797,115	39,962,441	44,302,091	17,760,228
Uruguay	†	†	150,061	133,317	70,310	48,041	144,821	1,593
Argentine Republic	721,704	1,187,680	1,257,409	1,726,469	693,269	2,129,748	3,676,068	1,939,261
Other foreign countries	2,394,733	33,113,760	10,767,572	19,612	746	332	157	5,670,165
	80,013,976	75,847,711	62,363,973	66,341,674	84,372,847	85,394,184	91,255,410	82,011,329

† Included in the figure for "Other Foreign Countries."

TABLE No. 12.—QUANTITIES AND VALUES OF MEAT OF ALL KINDS IMPORTED INTO THE
United Kingdom in the years 1938-1945.
(i) Quantities.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
BEEF :—								
Fresh and salted	5,461	13,572	7,413	377,622	123,442	20,912	57,776	77,760
Chilled	8,963,501	7,024,148	..	..	..	..	..	..
Frozen—								
Fore and hind-quarters	1,630,443	3,447,211	9,351,175	5,282,590	2,679,918	2,438,653	2,661,350	2,149,783
Boned and boneless	911,947	917,769	1,113,219	4,734,920	6,493,299	3,485,216	3,789,501	1,567,939
Tongues and other descriptions	754,768	804,445	855,876	645,491	597,029	483,184	535,969	364,944
Tinned, canned, &c.—								
Tongues	83,327	77,317	78,614	82,118	85,972	94,019	92,119	75,105
Other descriptions	1,000,321	1,643,281	2,176,302	3,343,435	1,709,188	2,396,306	3,005,182	1,520,421
VEAL, including fresh, chilled, frozen, tinned, canned	433,283	443,169	250,972	181,122	112,509	270,887	327,469	293,338
MUTTON and Lamb :—								
Fresh	24,047	24,219	9,108	85,626	48,384	3,126	9,361	2,771
Chilled or frozen—								
Mutton	1,604,916	1,334,633	2,420,631	976,393	1,095,990	1,109,564	1,970,872	2,171,554
Lamb	5,283,921	5,200,115	5,630,116	5,377,247	6,284,858	7,212,144	5,461,905	5,129,481
Other descriptions	225,851	222,478	255,717	239,618	236,675	260,924	256,994	262,253
Tinned, canned, &c.	118,490	89,986	97,323	176,162	134,543	208,410	460,821	232,857
PIG PRODUCTS :—								
Bacon	6,867,915	7,188,411	4,477,154	4,873,679	5,728,383	5,835,876	7,385,496	4,571,855
Hams	664,321	707,082	294,852	610,360	790,830	853,988	610,237	296,424
Fork—								
Fresh	36,844	33,180	21,869	21,622	346	4,320,921	7,299,742	3,850,297
Chilled or frozen	1,180,866	988,884	1,139,314	1,670,986	1,995,446	2,411	1,526	2,133
Salted, pickled, &c.	10,861	3,093	7,646	2,791	2,868	2,411	1,526	2,133
Other descriptions	185,176	181,616	203,896	170,634	169,131	181,364	487,365	179,734
Tinned, canned, &c., of all descriptions.	170,546	163,835	100,582	1,016,156	3,707,691	3,260,170	711,196	119,454
RABBITS, fresh and frozen	253,032	238,823	411,784	243,232	147,629	112,043	139,432	167,750
POULTRY (dead), all kinds	445,103	422,298	230,494	205,035	260,977	209,213	237,505	190,638
GAME (dead), fresh, chilled or frozen	25,356	13,089	527	725	1,812	3,852	3,251	2,790
EXTRACTS and essences	66,412	84,114	87,777	192,090	145,903	109,617	118,623	100,255
SAUSAGES of all kinds, other than tinned or canned	2,921	2,890	2,609	19,066	351	256	705	473
POULTRY and meat pastes, &c.; sausages, tinned, canned; meat pies	10,337	11,247	1,695	5,365	156,907	697,292	98,834	5,733
All other kinds	3,176	4,397	18,856	44,876	16,528	6,336	7,908	13,406
Total of Group	30,963,142	31,245,321	29,285,302	30,569,018	32,626,609	33,576,634	35,730,439	23,341,148

TABLE NO. 12 (*continued*).—QUANTITIES AND VALUES OF MEAT OF ALL KINDS IMPORTED INTO THE United Kingdom in the years 1938-1945.
(ii) *Values.*

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
	£	£	£	£	£	£	£	£
BEER:—								
Fresh and salted	7,504	23,546	24,338	2,284,464	576,544	88,765	241,106	354,288
Chilled	17,676,352	13,561,440	..	..	..	..	..	..
Frozen:—								
Fore and hind-quarters	2,632,342	6,523,305	21,567,807	13,117,742	8,266,789	6,700,392	7,746,935	9,835,305
Boned and boneless	1,609,177	1,670,799	3,502,273	15,832,561	22,286,865	13,969,624	15,522,180	7,683,288
Tongues and other descriptions	1,775,775	2,075,757	2,457,473	1,848,900	1,858,923	1,559,779	1,747,063	1,216,886
Tinned, canned, &c.—								
Tongues	733,145	755,517	999,135	1,077,418	1,183,512	1,326,746	1,290,298	1,037,776
Other descriptions	2,855,972	4,826,296	9,720,910	15,205,031	8,699,138	13,815,975	17,414,909	9,289,956
VEAL, including fresh, chilled, frozen, tinned, canned	1,108,010	1,150,352	669,202	557,772	359,346	884,441	1,224,121	984,648
MUTTON and lamb:—								
Fresh	84,661	98,249	48,778	445,956	265,452	18,469	48,138	14,627
Chilled or frozen—								
Mutton	2,810,483	2,129,060	4,809,564	2,167,226	2,456,743	2,882,632	5,471,365	6,462,576
Lamb	16,396,012	15,189,791	17,111,158	19,118,622	23,986,948	29,106,559	21,471,629	23,168,665
Other descriptions	662,956	671,457	899,610	916,397	962,409	1,089,187	1,112,866	1,050,666
Tinned, canned, &c.	333,496	302,178	466,200	824,025	684,646	1,401,285	2,429,469	1,271,937
PIC PRODUCE:—								
Bacon	30,920,940	33,336,074	24,634,139	22,531,114	29,973,982	34,376,925	43,217,574	27,358,200
Hams	3,015,391	3,370,336	1,613,903	2,974,086	4,019,077	4,420,704	3,289,359	1,610,658
Pork:—								
Fresh	129,431	133,086	109,152	109,589	1,171	22,252,769	32,505,079	16,181,103
Chilled or frozen	3,680,644	3,036,040	3,826,287	5,766,880	9,104,869	11,836	7,889	9,555
Salted, pickled, &c.	35,882	10,920	27,999	13,267	12,132	11,836	7,889	9,555
Other descriptions	418,001	425,059	579,919	579,319	584,555	609,520	1,923,844	650,270
Tinned, canned, &c., of all descriptions	1,218,902	1,148,298	787,090	7,467,525	27,281,105	24,505,713	5,342,470	924,985
RABBIT, fresh and frozen	452,017	396,815	904,736	977,726	694,205	508,368	541,293	567,293
POULTRY (dead), all kinds	1,741,692	2,018,698	1,577,546	1,946,922	2,616,297	2,273,558	2,682,225	2,171,061
GAME (dead), fresh, chilled, or frozen	1,117,373	61,848	1,154	1,946,922	15,042	29,934	47,952	33,054
EXTRACTS and essences	374,094	494,806	1,056,671	2,599,922	2,063,324	1,678,018	1,974,694	1,519,847
SAUSAGES of all kinds other than tinned or canned	19,793	18,954	15,186	120,304	1,930	1,474	3,373	2,042
POULTRY and meat pastes, &c.; sausages, tinned, canned; meat pies	57,894	53,144	9,339	27,272	776,926	3,457,286	594,518	38,873
All other kinds	11,929	15,644	83,159	241,560	81,038	32,145	14,177	30,308
Total of Group	90,679,859	93,297,467	97,202,718	118,756,808	148,813,608	167,002,104	167,864,536	113,468,367

TABLE No. 13.—SUMMARY OF TOTAL VALUES appearing in Table 12 of Meat imported into the United Kingdom in the years 1938-1945.

FROM—	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
Eire	£ 3,074,061	£ 3,453,720	£ 6,336,148	£ 9,355,858	£ 5,553,077	£ 4,138,404	£ 4,249,719	£ 4,833,845
Australia	11,000,425	10,050,793	11,784,843	11,373,195	7,401,806	8,959,311	7,152,595	7,491,009
New Zealand	14,680,534	13,567,194	18,022,425	17,553,560	21,495,400	16,430,907	14,325,857	23,630,027
Canada	6,964,856	7,641,163	14,597,063	18,170,031	24,320,804	32,490,990	43,896,706	35,359,178
Other British Countries	294,228	329,576	485,778	274,464	95,857	96,775	63,328	230,968
Lithuania	869,448	†	†	†	†	†	†	†
Sweden	1,159,729	1,142,592	437,156	†	†	†	†	†
Denmark	16,260,995	16,898,255	5,631,575	†	†	†	†	†
Poland	2,461,295	2,185,235	†	†	†	†	†	†
Netherlands	2,519,114	3,057,060	934,506	†	†	†	†	†
Hungary	692,635	755,322	609,313	†	†	†	†	†
United States of America	3,361,335	3,550,102	2,087,206	13,321,609	43,028,320	55,817,540	40,109,481	12,570,009
Chile	473,520	476,045	604,120	42,745	448,894	762,908	469,203	404,792
Brazil	1,585,678	2,028,718	6,889,854	7,333,513	7,339,108	5,601,372	3,966,595	2,413,406
Uruguay	2,525,163	2,460,769	4,020,798	5,545,745	3,149,135	4,895,009	4,558,939	3,141,549
Argentine Republic	21,262,180	22,725,604	24,017,555	35,132,436	36,607,043	36,861,239	47,941,696	20,792,533
Paraguay	123,661	341,727	227,297	597,027	334,594	1,019,719	657,583	597,488
Other Foreign Countries	1,370,982	2,633,492	517,081	6,625	39,570	127,930	473,834	2,003,463
Total	90,679,859	93,297,467	97,202,718	118,756,808	148,813,608	167,002,104	167,864,536	113,468,367

† Imports, if any, included in the figure for "Other Foreign Countries."

TABLE No. 14.—QUANTITIES AND VALUES OF BUTTER, MARGARINE, CHEESE, MILK PRODUCTS, AND EGGS imported into the United Kingdom in the years 1938-1945.

[From Trade and Navigation Returns.]

(i) Quantities.

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
BUTTER	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
CHEESE	9,517,913	8,736,967	5,287,013	4,362,574	2,686,288	3,032,189	3,064,012	3,802,689
Eggs in shell :—	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.
Poultry	2,927,326	2,845,425	3,124,387	4,068,775	6,305,951	4,139,869	5,038,357	3,825,203
Eggs, not in shell :—	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.	Th. doz.
Liquid or frozen, &c.	276,977	283,278	148,941	88,945	33,814	22,940	33,537	69,136
Dried whole	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Dried yolk	937,154	773,191	737,093	777,026	175,261	..	32	..
Dried albumen	6,357	3,454	8,955	149,834	1,120,937	1,468,527	1,600,095	705,523
LACTOSE (Sugar of milk)	3,510	6,474	11,320	20,016	4,530	..	1	..
MARGARINE	19,539	17,558	26,136	11,706	2,243	4,194	2,305	1,143
Milk and cream :—	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Condensed milk, unsweetened	1,233,384	661,040	445,681	741,104	298,799	439,200	448,000	784,000
Condensed milk, sweetened	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Whole	108,894	64,412	1,229	1,034	497	69	..	140
Separated or skimmed	52,987	60,035	28,705	2,686,860	3,722,410	2,632,414	1,738,293	1,203,549
Milk powder, unsweetened	316,306	280,056	833,838	16,030	47,635	68,534	106,629	77,234
Whole milk powder	100,128	84,525	59,813	91,365	69,585	44,228	18,079	27,050
Skimmed milk powder	1,217,718	1,036,166	514,585	100,790	106,841	109,233	93,176	163,371
Buttermilk and whey powder	91,798	85,149	88,473	423,429	1,191,528	1,512,590	1,566,290	434,951
Total of all other articles	263,602	191,998	189,267	5,644	..	..	..	1,000
	..	21,012	33,502	..	..	89,610	19,945	14,780

TABLE No. 14 (*continued*).—QUANTITIES AND VALUES OF BUTTER, MARGARINE, CHEESE, MILK PRODUCTS, AND EGGS imported into the United Kingdom in the years 1938-1945.

(ii) *Values.*

	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.
BUTTER	£ 50,873,133	£ 48,424,422	£ 32,957,727	£ 27,755,449	£ 17,746,994	£ 20,808,422	£ 21,189,281	£ 31,708,731
CHEESE	9,681,245	8,868,544	11,950,288	16,335,934	27,764,108	19,789,163	23,483,764	19,348,397
Eggs in shell :—								
Poultry	12,374,548	12,832,916	9,882,923	7,320,365	3,342,151	2,586,025	3,663,597	8,080,983
Eggs, not in shell :—								
Liquid or frozen, &c.	3,038,298	2,197,210	2,611,632	3,464,005	790,677	30,518,133	158	17,020,251
Dried whole	70,650	39,347	126,314	2,527,936	21,270,852	51,988	33,880,676	22,585
Dried yolk	32,408	45,850	91,473	209,463	40,844	85,949	46,777	36,284
Dried albumen	242,491	176,057	341,252	175,767	40,844	21,694	18,772	532
LACTOSE (Sugar of milk)	28,263	17,419	16,237	26,236	11,892	156	1,300	
MARGARINE	150,214	78,933	3,136	3,076	742			
MILK and cream :—								
Cream	251,891	304,781	187,002	6,735,215	9,100,592	6,457,976	4,166,262	2,917,846
Condensed milk, unsweetened	619,755	506,767	2,189,758	55,094	169,435	248,442	449,978	340,448
Condensed milk, sweetened—								
Whole	191,099	194,928	159,307	194,035	153,339	98,648	50,197	76,637
Separated or skimmed	1,638,715	1,545,732	948,791	528,411	633,280	631,336	562,226	940,512
Milk powder, unsweetened—								
Whole milk powder	317,404	310,405	408,074	981,450	2,738,039	3,541,096	3,699,389	1,493,734
Skimmed milk powder	393,293	240,839	400,870	7,846	..	..	..	1,400
Buttermilk and whey powder		19,098	42,553					
Total of all other articles	110,569	44,463	47,537	21,392	557,914	607,144	43,121	22,989
	80,013,976	75,847,711	62,363,973	66,341,674	84,372,847	85,394,184	91,255,410	82,011,329

EDINBURGH CORN MARKET.

STATEMENT SHOWING THE PRICES OF WHEAT, BARLEY, AND OATS FOR THE YEAR 1945.

The Corn Sales Act of 1921 provides that all sales are to be effected by weight only, and expressed in terms of or by reference to the hundredweight of 112 lb. Experience has proved it to be convenient to quote at a price per $4\frac{1}{2}$ cwt. for Wheat, 4 cwt. for Barley, and 3 cwt. for Oats.

The following statement gives a record of the year's proceedings in Edinburgh Corn Market.

1945.	WHEAT, per $4\frac{1}{2}$ cwt.		BARLEY, per 4 cwt.		OATS, per 3 cwt.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
January 3	63 9	..	100 0	90 0	46 3	43 6
" 10	63 9	..	100 0	90 0	46 3	43 6
" 17	63 9	..	100 0	90 0	46 3	43 6
" 24	63 9	..	100 0	90 0	46 3	43 6
" 31	63 9	..	100 0	90 0	46 3	43 6
February 7	65 3	..	100 0	90 0	47 3	44 6
" 14	65 3	..	100 0	90 0	47 3	44 6
" 21	65 3	..	100 0	90 0	47 3	44 6
" 28	65 3	..	100 0	90 0	47 3	44 6
March 7	66 9	..	100 0	90 0	47 3	44 6
" 14	66 9	..	100 0	90 0	47 3	44 6
" 21	66 9	..	100 0	90 0	47 3	44 6
" 28	66 9	..	100 0	90 0	47 3	44 6
April 4	68 3	..	100 0	90 0	48 9	46 0
" 11	68 3	..	100 0	90 0	48 9	46 0
" 18	68 3	..	100 0	90 0	48 9	46 0
" 25	68 3	..	100 0	90 0	48 9	46 0
May 2	68 3	..	100 0	90 0	48 9	46 0
" 9	68 3	..	100 0	90 0	48 9	46 0
" 16	68 3	..	100 0	90 0	48 9	46 0
" 23	68 3	..	100 0	90 0	48 9	46 0
" 30	68 3	..	100 0	90 0	48 9	46 0
June 6	69 0	..	100 0	90 0	48 9	46 0
" 13	69 0	..	100 0	90 0	48 9	46 0
" 20	69 0	..	100 0	90 0	48 9	46 0
" 27	69 0	..	100 0	90 0	48 9	46 0
July 4	69 0	..	100 0	90 0	48 9	46 0
" 11	69 0	..	100 0	90 0	48 9	46 0
" 18	69 0	..	100 0	90 0	48 9	46 0
" 25	69 0	..	100 0	90 0	48 9	46 0
August 1	69 0	..	100 0	90 0	44 3	42 0
" 8	69 0	..	100 0	90 0	44 3	42 0
" 15	69 0	..	100 0	90 0	44 3	42 0
" 22	69 0	..	100 0	90 0	44 3	42 0
" 29	69 0	..	100 0	90 0	44 3	42 0
September 5	69 0	..	100 0	90 0	44 3	42 0
" 12	69 0	..	100 0	90 0	44 3	42 0
" 19	69 0	..	100 0	90 0	44 3	42 0
" 26	69 0	..	100 0	90 0	44 3	42 0
October 3	60 9	..	100 0	90 0	44 3	42 0
" 10	60 9	..	100 0	90 0	44 3	42 0
" 17	60 9	..	100 0	90 0	44 3	42 0
" 24	60 9	..	100 0	90 0	44 3	42 0
" 31	60 9	..	100 0	90 0	44 3	42 0
November 7	61 6	..	100 0	90 0	44 9	42 0
" 14	61 6	..	100 0	90 0	44 9	42 0
" 21	61 6	..	100 0	90 0	44 9	42 0
" 28	61 6	..	100 0	90 0	44 9	42 0
December 5	62 3	..	100 0	90 0	45 3	42 6
" 12	62 3	..	100 0	90 0	45 3	42 6
" 19	62 3	..	100 0	90 0	45 3	42 6
" 26	62 3	..	100 0	90 0	45 3	42 6

PRICES OF SHEEP SINCE 1818.

TABLE No. 1.—CHEVIOT SHEEP.

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	28 0	to 30 0	not quoted.		8 0	to 10 0
1819	25 0	" 27 0	15 0	to 17 0	10 6	" 12 0
1820	20 0	" 25 0	16 0	" 17 0	10 0	" 11 0
1821	18 0	" 20 0	14 0	" 16 0	7 6	" 8 0
1822	12 6	" 13 0	8 0	" 8 6	4 6	" 0 0
1823	13 6	" 18 0	7 0	" 10 6	5 6	" 6 0
1824	14 0	" 19 0	7 0	" 9 0	4 6	" 6 0
1825	29 0	" 32 0	15 0	" 19 0	9 0	" 10 6
1826	17 6	" 21 6	18 0	" 15 0	7 0	" 7 6
1827	15 0	" 24 0	not quoted.		7 0	" 8 0
1828	18 0	" 27 6	12 0	to 15 0	7 0	" 8 2
1829	18 0	" 24 0	12 6	" 14 0	7 0	" 8 6
1830	15 0	" 21 0	8 0	" 11 0	6 0	" 6 9
1831	18 0	" 25 0	9 0	" 13 0	7 0	" 8 0
1832	19 0	" 24 0	11 0	" 16 0	7 0	" 9 0
1833	22 0	" 31 0	13 6	" 20 0	8 0	" 11 2
1834	22 0	" 31 0	18 6	" 21 0	9 0	" 11 6
1835	22 0	" 27 6	18 0	" 20 6	8 0	" 11 0
1836	24 0	" 31 6	16 0	" 19 0	10 0	" 14 0
1837	19 0	" 28 0	14 0	" 19 0	10 0	" 13 0
1838	28 0	" 30 6	17 0	" 22 0	12 0	" 14 0
1839	28 0	" 31 0	14 0	" 19 0	6 0	" 13 0
1840	24 0	" 33 0	15 0	" 23 0	7 0	" 11 6
1841	23 0	" 30 0	14 0	" 22 0	8 0	" 12 0
1842	22 6	" 28 0	13 0	" 17 0	7 6	" 10 0
1843	19 0	" 25 0	8 0	" 12 0	5 0	" 8 0
1844	21 0	" 29 0	10 0	" 16 0	8 0	" 10 6
1845	23 0	" 33 0	18 0	" 20 0	8 0	" 13 0
1846	24 0	" 33 6	14 6	" 21 6	10 0	" 14 6
1847	24 0	" 35 0	18 0	" 24 0	11 6	" 15 0
1848	28 0	" 34 6	18 0	" 28 0	11 6	" 15 0
1849	21 0	" 30 2	12 0	" 21 0	0 0	" 14 0
1850	20 6	" 29 6	12 0	" 20 0	8 0	" 13 0
1851	21 6	" 31 0	18 0	" 21 0	8 9	" 14 0
1852	21 0	" 32 0	15 0	" 23 0	8 0	" 14 0
1853	26 6	" 38 0	17 0	" 28 6	9 0	" 17 0
1854	25 0	" 36 0	17 0	" 26 0	9 0	" 16 6
1855	23 6	" 36 0	16 0	" 25 0	10 0	" 17 0
1856	22 0	" 35 6	15 6	" 24 0	10 0	" 15 0
1857	24 0	" 36 0	14 6	" 26 0	10 6	" 14 6
1858	24 0	" 34 6	14 0	" 24 6	10 6	" 14 0
1859	25 0	" 34 6	16 0	" 25 0	10 3	" 14 9
1860	26 0	" 38 0	17 6	" 27 6	12 6	" 17 6
1861	25 0	" 38 6	16 0	" 28 0	9 0	" 16 0
1862	27 0	" 37 6	17 6	" 28 0	10 0	" 16 0
1863	25 0	" 38 6	19 0	" 28 6	10 6	" 16 0
1864	31 0	" 41 0	21 0	" 31 6	14 0	" 18 0
1865	32 6	" 44 0	22 6	" 33 6	14 6	" 20 0
1866	37 0	" 50 0	29 0	" 42 6	15 0	" 26 0
1867	26 0	" 58 0	18 0	" 25 6	12 0	" 16 0
1868	30 0	" 32 0	15 6	" 31 0	7 6	" 13 0
1869	28 0	" 38 0	15 0	" 22 6	7 6	" 14 0
1870	35 6	" 48 0	18 0	" 28 0	10 0	" 17 0
1871	36 6	" 49 0	22 0	" 33 6	14 0	" 30 0
1872	45 0	" 56 0	32 0	" 42 0	16 0	" 22 0
1873	42 0	" 51 0	26 0	" 42 0	15 6	" 22 0
1874	38 6	" 44 6	21 0	" 36 0	12 0	" 17 0
1875	38 0	" 48 6	21 0	" 34 0	13 6	" 23 6
1876	40 0	" 52 6	23 0	" 30 0	13 6	" 25 0
1877	41 0	" 51 0	25 0	" 37 0	15 0	" 24 0
1878	35 6	" 48 0	23 6	" 35 0	14 0	" 22 0
1879	34 0	" 44 0	21 0	" 34 0	14 0	" 20 0
1880	30 0	" 42 6	20 0	" 30 0	12 6	" 30 0
1881	32 0	" 45 6	29 0	" 34 0	14 0	" 30 0
1882	40 0	" 51 0	30 0	" 40 0	14 0	" 30 6
1883	44 0	" 55 6	34 6	" 46 6	15 6	" 33 0

TABLE NO. 1.—CHEVIOT SHEEP—Continued.

Year.	Wethers.				Ewes.				Lambs.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1884	86	0	to	47	29	6	to	41	12	6	to	20
1885	80	0	"	38	24	0	"	81	12	0	"	18
1886	82	0	"	40	21	0	"	29	12	6	"	19
1887	29	0	"	36	18	0	"	26	11	0	"	16
1888	36	0	"	38	19	0	"	27	12	0	"	17
1889	36	0	"	44	24	0	"	82	14	0	"	22
1890	81	0	"	40	22	0	"	80	12	6	"	20
1891	27	0	"	38	16	0	"	25	9	0	"	16
1892	22	0	"	80	13	0	"	22	6	0	"	11
1893	26	0	"	85	18	0	"	28	8	6	"	15
1894	26	0	"	87	20	0	"	81	10	6	"	18
1895	28	0	"	89	22	0	"	84	11	6	"	19
1896	24	6	"	34	19	0	"	80	9	0	"	16
1897	27	0	"	36	21	0	"	81	11	0	"	17
1898	27	0	"	37	22	0	"	82	12	0	"	18
1899	24	0	"	33	20	0	"	80	10	6	"	16
1900	26	0	"	36	22	0	"	82	12	0	"	17
1901	25	0	"	82	20	0	"	29	11	0	"	16
1902	24	0	"	81	18	0	"	27	9	6	"	14
1903	26	0	"	84	21	0	"	81	11	4	"	18
1904	28	6	"	86	23	0	"	82	18	0	"	20
1905	27	6	"	35	23	0	"	83	14	0	"	21
1906	30	0	"	38	26	0	"	84	15	0	"	23
1907	28	0	"	34	22	0	"	30	18	6	"	19
1908	26	0	"	32	21	0	"	27	11	6	"	17
1909	24	0	"	31	18	0	"	25	9	6	"	16
1910	27	0	"	35	22	0	"	31	12	0	"	20
1911	24	0	"	31	18	6	"	27	10	6	"	18
1912	26	0	"	34	22	0	"	31	18	0	"	21
1913	50	0	"	39	24	0	"	35	16	0	"	24
1914	32	6	"	41	28	0	"	39	18	0	"	27
1915	36	0	"	46	31	0	"	44	20	0	"	30
1916	40	6	"	51	34	0	"	49	22	0	"	34
1917	43	6	"	56	38	0	"	56	24	0	"	34
1918	50	0	"	66	42	0	"	61	25	0	"	37
1919	53	0	"	69	44	6	"	67	28	0	"	40
1920	56	0	"	91	48	0	"	79	34	0	"	49
1921	45	0	"	60	52	3	"	85	38	9	"	52
1922	40	0	"	56	56	0	"	90	27	0	"	50
1923	44	0	"	65	61	0	"	106	30	0	"	62

Year.	Wethers.				Ewes.				Lambs.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1924	41	0	to	61	60	0	to	100	31	6	to	58
1925	39	3	"	50	56	0	"	88	22	3	"	50
1926	35	0	"	49	34	6	"	64	26	3	"	42
1927	28	9	"	46	32	6	"	55	28	3	"	39
1928	28	3	"	48	30	6	"	55	22	9	"	47
1929	33	6	"	54	34	9	"	52	25	6	"	47
1930	36	0	"	54	35	0	"	74	24	0	"	47
1931	24	0	"	45	28	0	"	50	17	0	"	37
1932	16	0	"	26	18	0	"	36	10	0	"	24
1933	16	0	"	28	25	3	"	40	16	6	"	31
1934	16	0	"	34	22	6	"	44	19	6	"	33
1935	22	0	"	37	24	0	"	44	16	0	"	33
1936	24	6	"	50	28	0	"	55	18	6	"	37
1937	24	6	"	49	29	9	"	76	19	0	"	45
1938	17	0	"	39	20	9	"	64	10	9	"	31
1939	19	6	"	42	18	6	"	43	11	6	"	39
1940	31	0	"	64	22	6	"	60	15	6	"	41
1941	36	6	"	66	26	6	"	71	18	3	"	59
1942	37	0	"	67	38	6	"	90	20	6	"	59
1943	39	6	"	72	38	6	"	140	23	6	"	64
1944	42	6	"	78	33	6	"	145	22	0	"	70
1945	48	6	"	92	34	6	"	131	21	6	"	69

TABLE No. 2.—BLACKFACE SHEEP.

Year.	Wethers.		Ewes.		Lambs.	
	s.	d.	s.	d.	s.	d.
1819	22	0 to 24	12	0 to 15	8	0 to 9
1820	20	0 " 22	15	6 " 17	7	0 " 8
1821	18	0 " 20	12	0 " 18	6	0 " 7
1822	11	6 " 13	5	6 " 6	4	6 " 0
1823	12	0 " 16	5	0 " 6	4	0 " 5
1824	9	6 " 18	6	0 " 7	4	0 " 5
1825	22	0 " 26	11	0 " 18	6	0 " 9
1826	15	0 " 17	8	0 " 9	4	6 " 6
1827	14	0 " 18	7	0 " 10	6	0 " 7
1828	15	0 " 20	8	0 " 11	5	0 " 7
1829	14	0 " 18	9	0 " 10	6	0 " 7
1830	9	6 " 18	4	0 " 8	4	6 " 6
1831	18	0 " 17	5	0 " 7	5	6 " 6
1832	14	0 " 18	7	0 " 11	6	0 " 7
1833	16	0 " 24	7	6 " 12	6	6 " 9
1834	16	0 " 22	10	0 " 18	6	0 " 8
1835	15	0 " 18	10	0 " 18	7	0 " 8
1836	15	0 " 21	9	0 " 12	8	6 " 11
1837	18	0 " 16	8	0 " 12	8	0 " 9
1838	15	0 " 20	10	0 " 18	not quoted.	
1839	15	0 " 22	10	0 " 12	7	0 to 8
1840	15	0 " 22	11	0 " 12	7	0 " 9
1841	16	0 " 20	9	0 " 11	6	0 " 8
1842	14	0 " 19	7	6 " 8	5	6 " 7
1843	not quoted.		4	9 " 6	not quoted.	
1844	15	0 to 21	6	6 " 10	5	0 to 8
1845	14	0 " 28	8	0 " 12	6	0 " 8
1846	18	0 " 24	10	0 " 18	8	0 " 9
1847	20	6 " 25	10	0 " 14	8	6 " 9
1848	20	0 " 24	11	3 " 12	8	6 " 10
1849	not quoted.		not quoted.		7	0 " 7
1850	not quoted.		not quoted.		7	0 " 0
1851	17	6 to 23	9	0 to 12	6	6 " 8
1852	18	6 " 22	9	6 " 12	4	6 " 7
1853	23	0 " 27	14	6 " 16	8	0 " 11
1854	20	0 " 26	11	0 " 16	8	0 " 10
1855	22	6 " 26	14	0 " 16	10	0 " 11
1856	17	0 " 24	10	0 " 20	7	6 " 10
1857	20	0 " 29	10	6 " 15	9	3 " 11
1858	20	0 " 27	9	9 " 18	8	3 " 10
1859	20	0 " 25	10	0 " 14	8	9 " 11
1860	21	0 " 27	11	0 " 16	10	0 " 13
1861	21	0 " 29	12	0 " 22	6	3 " 14
1862	16	9 " 27	12	0 " 18	6	0 " 12
1863	20	0 " 30	18	0 " 16	8	0 " 11
1864	25	0 " 30	15	0 " 19	10	0 " 13
1865	15	6 " 32	18	0 " 25	10	0 " 17
1866	81	6 " 40	20	0 " 38	18	6 " 23
1867	20	0 " 30	14	0 " 22	7	6 " 18
1868	20	0 " 26	10	6 " 18	7	0 " 13
1869	22	0 " 28	11	0 " 14	6	9 " 9
1870	27	0 " 32	13	0 " 22	8	0 " 14
1871	29	0 " 37	13	0 " 23	11	0 " 16
1872	31	6 " 45	13	0 " 32	12	6 " 18
1873	28	0 " 39	14	6 " 27	7	0 " 16
1874	25	0 " 35	13	0 " 30	7	0 " 14
1875	26	6 " 37	15	0 " 21	9	6 " 17
1876	30	0 " 40	19	0 " 24	13	0 " 20
1877	35	0 " 38	18	0 " 25	13	6 " 23
1878	30	0 " 36	17	0 " 23	12	0 " 22
1879	25	0 " 35	16	0 " 24	10	6 " 20
1880	25	0 " 38	16	6 " 22	10	0 " 17
1881	30	0 " 39	15	0 " 23	10	0 " 15
1882	33	0 " 46	20	0 " 28	12	6 " 18
1883	36	0 " 50	24	6 " 33	14	0 " 21
1884	29	0 " 43	19	6 " 28	12	0 " 19
1885	24	0 " 34	13	0 " 22	10	0 " 15
1886	25	0 " 34	12	0 " 22	10	6 " 16
1887	22	0 " 30	11	0 " 19	8	0 " 13
1888	22	0 " 32	18	0 " 24	10	0 " 15
1889	26	0 " 40	18	0 " 29	13	0 " 22

TABLE NO. 2.—BLACKFACE SHEEP—Continued.

Year.	Wethers.				Ewes.				Lambs.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1890	24	0	to	37	0	14	0	to	27	0	10	6
1891	21	0	"	37	0	10	0	"	24	0	7	6
1892	16	0	"	28	6	6	0	"	17	0	3	0
1893	21	0	"	37	0	12	0	"	24	0	7	0
1894	20	0	"	37	0	14	6	"	26	6	8	6
1895	23	0	"	41	0	16	0	"	28	6	9	0
1896	19	0	"	35	4	13	0	"	24	0	6	0
1897	21	0	"	36	6	15	0	"	25	6	7	0
1898	22	0	"	37	0	16	0	"	26	6	8	0
1899	20	0	"	33	6	13	0	"	24	0	5	6
1900	23	0	"	36	0	16	0	"	26	6	8	0
1901	20	0	"	35	0	14	0	"	25	6	6	6
1902	18	6	"	34	0	12	0	"	24	0	6	0
1903	21	0	"	36	0	15	0	"	28	0	7	0
1904	25	0	"	38	6	18	0	"	30	0	8	6
1905	21	6	"	37	0	19	0	"	31	0	9	0
1906	22	0	"	38	6	20	0	"	33	0	10	0
1907	21	0	"	33	6	17	0	"	28	0	8	6
1908	19	6	"	30	0	15	0	"	24	6	8	0
1909	17	0	"	28	0	11	6	"	22	0	6	3
1910	21	0	"	32	6	16	0	"	27	6	8	0
1911	19	0	"	29	6	14	0	"	24	0	7	0
1912	21	6	"	32	6	17	0	"	27	6	9	6
1913	24	6	"	36	0	21	0	"	31	0	12	6
1914	27	0	"	38	6	25	0	"	34	6	15	6
1915	31	0	"	42	6	29	0	"	39	6	17	0
1916	33	0	"	46	6	31	0	"	42	0	19	0
1917	36	0	"	51	0	33	0	"	47	0	21	0
1918	41	0	"	56	0	36	0	"	50	0	27	0
1919	44	0	"	62	0	39	0	"	54	0	29	0
1920	46	0	"	66	0	44	0	"	62	0	31	0
1921	32	9	"	60	9	35	3	"	62	6	20	3
1922	40	3	"	63	0	40	6	"	74	0	18	0
1923	46	0	"	65	6	43	0	"	78	0	21	0
1924	46	0	"	68	6	45	6	"	85	0	25	0
1925	56	0	"	60	0	40	0	"	78	0	17	6

Year.	Wethers.				Ewes.				Lambs.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1926	30	0	to	54	0	31	0	to	70	0	21	9
1927	26	6	"	48	0	26	0	"	64	0	17	9
1928	29	0	"	45	9	24	0	"	57	0	16	6
1929	29	9	"	46	0	29	0	"	64	0	20	9
1930	31	6	"	45	0	28	6	"	60	0	20	0
1931	19	6	"	29	9	15	0	"	38	0	14	3
1932	12	0	"	19	6	15	0	"	29	0	7	3
1933	..	..	..	..	20	0	"	34	0	12	9	"
1934	..	..	..	..	22	6	"	44	0	16	0	"
1935	..	..	..	..	26	0	"	40	0	16	0	"
1936	..	..	..	..	27	6	"	48	0	18	6	"
1937	..	..	..	..	32	0	"	54	0	22	6	"
1938	..	..	..	..	22	0	"	50	0	12	6	"
1939	..	..	..	..	17	6	"	40	0	12	6	"
1940	..	..	..	..	22	6	"	50	0	16	0	"
1941	..	..	..	..	27	6	"	52	6	19	0	"
1942	..	..	..	..	28	0	"	51	0	16	9	"
1943	34	0	to	61	9	32	6	"	63	0	21	9
1944	37	0	"	70	6	30	6	"	66	0	23	6
1945	45	0	"	67	9	30	0	"	69	0	22	3

TABLE No. 3.—PRICE OF WOOL, PER STONE OF 24 LB., SINCE 1818.

Year.	Laid Cheviot.		White Cheviot.		Laid Highland.		White Highland.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	40 0	to 42 2	..	..	20 0	to 22 6	..	..
1819	21 0	" 22 0	..	..	10 0	" 10 3	..	..
1820	20 0	" 22 0	..	..	9 0	" 10 0	..	..
1821	18 0	" 20 0	..	..	9 0	" 10 0	..	..
1822	12 6	" 14 6	..	..	5 0	" 6 6	..	..
1823	9 0	" 10 6	..	..	5 0	" 5 9	..	..
1824	18 6	" 15 0	..	..	6 0	" 6 3	..	..
1825	10 6	" 22 0	..	..	10 0	" 10 6	..	..
1826	11 0	" 14 0	..	..	5 0	" 5 6	..	..
1827	11 0	" 14 0	..	..	5 6	" 6 9	..	..
1828	8 0	" 11 0	..	..	5 6	" 6 0	..	..
1829	8 6	" 11 0	..	..	4 3	" 0 0	..	..
1830	9 6	" 11 0	..	..	4 6	" 5 0	..	..
1831	17 0	" 20 0	..	..	7 6	" 8 6	..	..
1832	14 0	" 16 0	..	..	7 0	" 7 6	..	..
1833	18 0	" 20 7	..	..	10 0	" 11 0	..	..
1834	21 0	" 24 6	..	..	5 6	" 7 0	..	..
1835	19 0	" 20 6	..	..	9 6	" 10 8	..	..
1836	21 0	" 25 0	..	..	10 0	" 14 0	..	..
1837	12 0	" 14 0	..	..	7 0	" 7 8	..	..
1838	19 0	" 22 6	..	..	6 0	" 10 0	..	..
1839	18 0	" 20 0	..	..	8 0	" 12 0	..	..
1840	15 0	" 0 0	..	..	7 0	" 0 0	..	..
1841	15 0	" 16 9	..	..	6 0	" 7 5	..	..
1842	12 6	" 14 0	..	..	not quoted.	..	..	..
1843	9 0	" 11 6	..	..	5 0	to 6 0	..	..
1844	15 0	" 18 0	..	..	not quoted.	..	..	..
1845	14 6	" 17 6	..	..	7 6	to 8 6	..	..
1846	12 0	" 14 6	..	..	8 0	" 8 6	..	..
1847	12 6	" 14 0	..	..	not quoted.	..	..	..
1848	9 6	" 11 0	..	..	4 9	to 0 0	..	..
1849	12 0	" 16 6	..	..	6 0	" 6 3	..	..
1850	15 0	" 17 6	..	..	8 0	" 8 6	..	..
1851	12 0	" 16 0	..	..	8 0	" 9 3	..	..
1852	13 0	" 15 0	..	..	8 0	" 9 0	..	..
1853	19 0	" 22 0	..	..	11 0	" 12 6	..	..
1854	12 0	" 15 0	..	..	7 6	" 8 6	..	..
1855	14 6	" 19 0	..	..	8 6	" 9 0	..	..
1856	19 0	" 21 6	..	..	11 0	" 0 0	..	..
1857	19 0	" 24 0	..	..	18 0	" 14 3	..	..
1858	15 0	" 17 0	..	..	8 9	" 10 0	..	..
1859	18 6	" 24 0	..	..	10 9	" 11 6	..	..
1860	22 0	" 32 0	27 0 to 38 0	..	10 0	" 11 3	..	..
1861	19 6	" 27 0	from 30s. upwards.	..	not quoted.	..	..	..
1862	18 6	" 26 0	30 0 to 37 0	..	11 6	to 16 0	..	..
1863	25 6	" 31 0	38 0 " 42 0	..	15 3	" 17 6	..	..
1864	31 0	" 39 0	47 0 " 54 0	..	17 6	" 20 0	..	..
1865	23 0	" 30 0	44 0 " 45 0	..	15 0	" 17 0	..	..
1866	24 0	" 30 0	50 0 " 38 0	..	14 0	" 16 0	..	..
1867	16 0	" 21 6	not quoted.	..	not quoted.	..	..	..
1868	19 0	" 26 0	28 0 to 32 0	..	8 6	to 9 0	..	..
1869	18 0	" 26 6	not quoted.	..	8 6	" 10 0	..	..
1870	15 0	" 23 6	25 0 to 28 0	..	9 6	" 0 0	..	..
1871	20 0	" 26 6	30 0 " 34 6	..	12 0	" 15 0	..	..
1872	26 0	" 37 6	40 0 " 48 0	..	18 0	" 21 0	..	..
1873	17 0	" 18 0	34 0 " 40 0	..	9 0	" 12 0	..	..
1874	18 6	" 26 6	30 0 " 34 0	..	9 6	" 13 0	..	..
1875	25 0	" 32 6	34 6 " 36 0	..	12 6	" 16 0	..	..
1876	20 0	" 24 0	30 0 " 34 6	..	9 6	" 12 0	..	..
1877	20 9	" 26 0	28 0 " 30 0	..	10 0	" 12 0	..	..
1878	18 9	" 25 0	27 0 " 32 0	..	8 6	" 11 6	..	..
1879	15 6	" 17 0	prices very low.	..	7 0	" 0 0	..	..
1880	20 0	" 24 0	30 0 to 32 0	..	10 6	" 11 6	14 0	to 15 0
1881	17 0	" 21 0	27 0 " 30 0	..	5 0	" 9 6	12 0	" 13 0
1882	14 0	" 18 0	27 6 " 28 0	..	7 6	" 9 0	13 0	" 14 0
1883	18 0	" 18 0	26 0 " 28 0	..	6 6	" 8 6	11 6	" 12 6
1884	18 0	" 18 0	26 0 " 28 0	..	6 6	" 8 6	11 6	" 12 6
1885	12 0	" 17 0	22 6 " 26 0	..	6 0	" 8 0	11 6	" 12 0
1886	13 0	" 18 0	23 0 " 27 6	..	6 6	" 8 6	11 6	" 12 0
1887	14 0	" 22 0	23 0 " 28 0	..	7 0	" 9 0	11 6	" 13 0
1888	13 0	" 20 0	23 0 " 28 0	..	7 0	" 9 0	11 0	" 12 6

TABLE No. 3.—PRICE OF WOOL—*Continued.*

Year.	Laid Cheviot.		White Cheviot.		Laid Highland.		White Highland.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1889	13 0	to 18 0	24 0	to 28 0	7 0	to 9 0	11 0	to 12 6
1890	13 0	" 18 0	24 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1891	12 6	" 18 0	22 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1892	12 0	" 18 0	20 0	" 28 0	7 0	" 8 6	10 6	" 12 0
1893	12 0	" 17 0	20 0	" 27 0	7 0	" 8 0	10 0	" 12 0
1894	12 0	" 16 0	20 0	" 26 0	7 0	" 8 0	10 0	" 12 0
1895	12 0	" 16 0	20 0	" 25 0	7 0	" 8 0	10 0	" 11 6
1896	11 0	" 15 0	19 0	" 24 0	7 0	" 8 0	10 0	" 11 6
1897	11 0	" 14 0	18 0	" 23 0	7 0	" 8 0	10 6	" 12 0
1898	10 0	" 13 0	16 0	" 20 0	7 0	" 8 0	10 0	" 11 6
1899	10 0	" 13 0	15 0	" 18 6	7 0	" 8 0	8 6	" 9 6
1900	9 9	" 12 0	13 0	" 18 6	6 9	" 7 9	8 0	" 9 6
1901	9 0	" 10 0	11 0	" 16 6	5 9	" 6 6	8 0	" 9 0
1902	9 0	" 10 0	11 6	" 17 0	6 0	" 6 6	8 6	" 9 6
1903	10 0	" 12 0	15 0	" 18 0	7 0	" 8 0	11 6	" 12 6
1904	15 0	" 17 0	20 0	" 21 0	9 0	" 10 0	14 0	" 15 0
1905	17 0	" 20 0	24 0	" 26 0	10 0	" 11 0	15 0	" 16 0
1906	18 0	" 21 0	27 0	" 28 6	11 6	" 13 0	16 6	" 17 6
1907		"	22 0	" 24 0	11 0	" 12 6	16 0	" 17 0
1908		*	16 0	" 18 0	†		8 0	" 8 6
1909		*	24 0	" 26 0	†		12 6	" 14 0
1910		*	25 0	" 30 0	†		13 0	" 14 6
1911		*	25 0	" 30 0	†		13 0	" 14 6
1912		*	24 0	" 29 0	†		14 0	" 15 0
1913		*	25 0	" 30 0	†		17 0	" 18 0
1914		*	24 0	" 29 0	†		16 0	" 15 6
1915‡		*	42 0	" 46 0	†		21 0	" 22 0

* No Cheviots smeared now.

† No Highlands smeared now.

‡ These are July prices.

PRICE OF WOOL PER STONE OF 24 LB.—Continued.

		CHEVIOT.				HALF-BRED.				BLACK-FACE.		CROSS-BRED (BLACKFACE EWE AND LIMESTER RAM).			
		Hogg.		EWE AND WETHER.		Hogg.		EWE AND WETHER.		Hogg.	EWE AND WETHER.	Hogg.		EWE AND WETHER.	
		Washed.	Un- washed.	Washed.	Un- washed.	Washed.	Un- washed.	Washed.	Un- washed.			Washed.	Un- washed.	Washed.	Un- washed.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1 1916	CAITHNESS & SUTH- ERLAND	36 6	80 0	33 0	27 6	34 6	28 6	32 0	27 6	23 0	23 0	28 6	25 6	28 6	25 6
		40 0	82 6	34 0	29 0	35 0	29 0	34 0	28 6						
1 1917	CAITHNESS & SUTH- ERLAND	40 6	83 6	37 0	31 0	38 6	31 6	37 0	31 0	25 6	25 6	31 6	28 6	31 6	28 6
		44 6	86 0	37 6	32 6	39 0	32 6	37 6	31 6						
1 1918	CAITHNESS & SUTH- ERLAND	43 6	85 6	39 6	33 0	41 0	33 6	39 6	33 0	27 0	27 0	33 6	30 6	33 6	30 6
		47 6	88 6	40 0	34 6	41 6	34 6	40 0	33 6						
1919	CAITHNESS & SUTH- ERLAND	84 0	70 0	82 0	66 0	82 0	62 0	70 0	58 0	34 0	34 0	46 0	39 0	44 0	38 0
		88 0	74 0	84 0	68 0	84 0	63 0	72 0	60 0						
1920	CAITHNESS & SUTH- ERLAND	86 0	70 0	83 0	66 0	74 0	54 0	65 0	50 0	24 0	24 0	35 0	29 0	34 0	27 0
		90 0	74 0	87 0	68 0	76 0	56 0	68 0	52 0						
1921	CAITHNESS & SUTH- ERLAND	22 0	17 0	19 0	15 0	18 6	14 6	16 0	13 0	9 6	9 6	12 0	10 0	12 0	10 0
		23 0	18 0	20 0	16 0	19 6	15 6	17 0	14 0						
1922	CAITHNESS & SUTH- ERLAND	30 0	25 0	26 0	22 0	26 0	20 0	22 0	18 0	16 0	16 0	16 6	15 0	16 6	15 0
		31 6	26 0	27 0	23 0	27 0	21 0	23 0	19 0						
1923	CAITHNESS & SUTH- ERLAND	41 0	34 0	36 0	30 0	33 0	27 0	30 0	25 0	17 6	17 6	20 0	18 0	20 0	18 0
		43 0	35 0	37 0	31 0	34 0	28 0	31 0	26 0						
1924	CAITHNESS & SUTH- ERLAND	58 0	49 0	53 6	45 0	49 0	40 0	45 0	39 0	25 6	25 6	34 6	30 6	33 0	30 0
		60 0	50 0	54 0	46 0	50 0	41 0	46 0	40 0						
1925	CAITHNESS & SUTH- ERLAND	39 0	34 0	36 0	30 0	33 6	28 6	32 0	27 0	25 6	25 6	26 0	23 6	25 6	23 0
		40 6	35 0	37 0	31 0	34 0	29 0	33 0	28 0						
1926	CAITHNESS & SUTH- ERLAND	35 0	29 0	32 0	26 0	32 0	26 6	28 0	24 6	19 0	19 0	22 6	20 0	22 0	19 6
		36 0	30 0	33 0	29 0	33 0	27 6	29 0	25 6						
1927	Do.	38 0	31 0	35 0	31 0	34 6	29 6	32 0	27 6	24 0	24 0	27 0	25 6	27 0	25 0
		39 0	32 0	36 0	32 0	35 0	30 0	33 0	28 6						
1928	Do.	51 0	43 0	48 0	41 0	47 0	40 0	43 0	37 0	24 6	24 6	33 0	31 0	32 0	30 0
		52 0	44 0	49 0	42 0	48 0	41 0	44 0	38 0						
1929		37 0	32 0	34 6	29 6	34 0	29 0	32 0	27 0	24 0	24 0	27 0	25 0	26 0	24 0
1930		28 0	19 0	22 0	18 0	21 0	17 6	20 6	16 6	12 0	12 0	17 6	15 6	16 6	15 6
1931		16 6	13 6	15 6	13 0	15 0	13 0	13 6	11 6	11 0	11 0	12 0	10 6	11 6	10 0
1932		14 6	11 6	14 0	11 6	12 6	11 6	11 6	9 6	8 0	8 0	9 0	8 6	8 6	7 6
1933		20 0	17 0	19 0	16 0	18 0	16 0	17 0	14 0	11 6	11 6	12 0	11 0	11 6	11 0
1934		21 6	17 6	21 0	17 6	19 0	17 0	17 0	14 0	10 0	10 0	12 0	11 0	12 0	11 0
1935		24 0	21 0	24 6	19 6	21 6	19 0	19 0	17 0	10 6	10 6	14 0	12 6	14 0	12 6
1936		27 0	22 0	25 6	20 6	21 6	19 0	19 0	17 0	14 0	14 0	17 0	16 0	17 0	16 0
1937		39 0	35 0	38 0	33 6	34 6	32 0	34 6	31 6	26 0	26 0	32 0	29 0	32 0	29 0
1938		22 0	19 0	21 6	18 6	21 0	18 6	20 0	18 6	12 0	12 0	16 0	14 6	16 0	14 6
1939		26 0	22 0	25 6	21 6	24 0	21 6	23 6	21 6	15 0	15 0	31 0	19 0	21 0	19 0
1 1940		37 0	30 6	37 0	30 6	33 0	29 6	33 0	29 6	25 0	25 0	33 6	26 0	28 6	26 0
1 1941		42 0	35 6	42 0	35 6	37 6	34 0	37 6	34 0	29 0	29 0	38 0	30 0	33 0	30 0
1 1942		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6	33 0	33 0	37 0	34 0	37 0	34 0
1 1943		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6	33 0	33 0	37 0	34 0	37 0	34 0
1 1944		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6	33 0	33 0	37 0	34 0	37 0	34 0
1 1945		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6	33 0	33 0	37 0	34 0	37 0	34 0

¹ The prices given were prices fixed by Government, and not free market prices.

Premiums awarded by the Society, 1945.

VETERINARY DEPARTMENT.

CLASS EXAMINATIONS, 1945.

Silver Medals were awarded to the following :—

GLASGOW VETERINARY COLLEGE.

Chemistry	William J. M'Meekin, Glasgow.
Biology	Thomas P. Lindsay, Glasgow.
Senior Anatomy	David M'Cracken, Glasgow.
Junior Anatomy	Edith D. Gordon, Glasgow.
Physiology	James C. Dunlop, Glasgow.
Zootechny	Robert Y. Anderson, Glasgow.
Pathology	R. S. F. Campbell, Glasgow.
Hygiene	David M'Cracken, Glasgow.
Surgery	Jamesina Mackenzie, Torridon.
Medicine	Donald Campbell, Tiree.
Histology	William M. Moors, Ayr.
Pharmacology	David M'Cracken, Glasgow.
Parasitology	R. S. F. Campbell, Glasgow.

13 Large Silver Medals, £24, 9s. 3d.

ROYAL (DICK) VETERINARY COLLEGE.

Chemistry	G. E. Hayes, Burnside.
Biology	G. E. Hayes, Burnside.
Senior Anatomy	J. M. Wilson, Gateshead.
Junior Anatomy	K. W. Head, London.
Physiology	J. E. Huddart, Newcastle.
Zootechny	J. F. Cowie, Aberdeen.
Pathology	J. B. Wilson, Nantwich.
Animal Husbandry	J. C. Wilson, Longniddry.
Surgery	G. Duncan, Blairgowrie.
Medicine	G. Duncan, Blairgowrie.
Histology	J. M. Riddell-Swan, Stranraer.
Pharmacology	L. G. Donald, Edinburgh.
Parasitology	J. B. Wilson, Nantwich.

13 Large Silver Medals, £24, 9s. 3d.

LOCAL GRANTS, &c., 1945.

11 Districts—	Grants of £15 each for Stallions engaged	£165 0 0
	Special Grants ; Medals, £21, 15s. 3d. . . .	36 15 3
	Medals for Scottish Gardens and Allotments Competition .	4 15 8
6 „	Medals for Hoeing, 1944-45	5 7 6
29 „	Medals for Ploughing, 1944-45	33 14 2
Long Service	Certificates, £121, 9s. 5d. ; and Silver Medals, £80, 5s. 10d.	
(1944-45)	. . . . .	181 15 3
		<hr/> £427 7 10

ABSTRACT OF PREMIUMS.

Local Grants	£245 12 7
Long Service Awards	181 15 3
Veterinary Colleges (26 Medals)	48 18 6
	<hr/> £476 6 4

[ABSTRACT OF ACCOUNTS.

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

As at 30th NOVEMBER 1945

GENERAL FUNDS.

I. BRITISH GOVERNMENT SECURITIES—			
£25,000 3½ per cent War Loan, at 102½	.	.	£25,718 15 0
£20,000 3½ per cent Conversion Loan, at 105½	.	.	21,175 0 0
£2,500 3 per cent Do. do. at 102	.	.	2,550 0 0
£5,000 3 per cent Funding Loan, at 101	.	.	5,050 0 0
£1,000 3 per cent Defence Bonds, at 102½	.	.	1,027 10 0
£10,000 3 per cent War Loan, at 102½	.	.	10,225 0 0
£2,300 3 per cent Savings Bonds, 1955-65, at 101½	.	.	2,337 7 6
£3,000 Do. do. 1960-70, at 100½	.	.	3,026 5 0
£2,500 Do. do. 1965-75, at 100½	.	.	2,518 15 0
			<hr/>
			£73,628 12 6
II. HERITABLE BOND—			
£2,500 at Commissioners' Rates	.	.	2,500 0 0
III. RAILWAY DEBENTURE AND PREFERENCE STOCKS—			
£18,000 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	.	£16,380	0 0
£12,000 Do. do. 4 per cent do., at 102½	.	12,270	0 0
£17,000 London Midland and Scottish Railway Co. 4 per cent Debenture Stock, at 103	.	17,510	0 0
£1,500 Do. do. 4 per cent Preference Stock, at 77	.	1,155	0 0
£2,000 Southern Railway Co. 4 per cent Debenture Stock, at 105	.	2,100	0 0
			<hr/>
			49,415 0 0
IV. BANK STOCKS—			
£5,400 Royal Bank of Scotland Stock, at 476 x.d.	.	£25,704	0 0
£2,300 Bank of England Stock, at 395½	.	9,102	5 0
£1,800 Bank of Scotland Stock, at 68s.	.	6,120	0 0
£2,850 Barclays Bank Ltd. "B" Stock, at 75s. 6d.	.	10,758	0 0
			<hr/>
			51,684 5 0
V. COLONIAL GOVERNMENT STOCKS—			
£2,000 Western Australia 4 per cent Inscribed Stock (1942-62), at 101½	.	£2,035	0 0
£2,000 New Zealand Government 5 per cent Inscribed Stock (1946), at 102½	.	2,042	10 0
£1,120 Victorian Government 3½ per cent Con- solidated Inscribed Stock (1929-49), at 101	.	1,131	4 0
			<hr/>
			5,208 14 0
VI. DEPOSIT RECEIPTS with the Royal Bank of Scotland, Edinburgh			
			2,000 0 0
VII. ESTIMATED VALUE of Building—			
8 Eglinton Crescent, Edinburgh	.	.	5,000 0 0
VIII. ESTIMATED VALUE of Furniture, Paintings, Books, &c.			
	.	.	1,500 0 0
IX. ARREARS OF SUBSCRIPTIONS considered recoverable			
	.	.	97 1 0
X. BALANCES at 30th November 1945			
	.	.	1,448 8 6
AMOUNT OF GENERAL FUNDS			<hr/>
			£192,482 1 0

SPECIAL FUNDS.

TWEEDDALE GOLD MEDAL FUND—

£605 London and North-Eastern Railway Co. 4 per cent Debenture Stock, at 102½	£618 12 2
£100 3 per cent Local Loans Stock, at 97	97 0 0
Sum on Deposit Receipt with British Linen Bank	155 5 8
Do. Current Account do.	2 13 8
	<hr/>
	£873 11 6

FIFE AND KINROSS PERPETUAL GOLD CHALLENGE CUP FUND—

£268 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	£243 17 7
£201 Do. do. 4 per cent First Guaranteed Stock, at 99	198 19 10
Sum on Deposit Receipt with British Linen Bank	151 9 8
Do. Current Account do.	3 6 8
	<hr/>
	597 13 9

PAISLEY PERPETUAL GOLD CHALLENGE CUP FUND—

£802 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	£729 16 5
£100 3 per cent Savings Bonds, 1955-65, at 101½	101 12 6
Sum on Deposit Receipt with British Linen Bank	155 2 8
Do. Current Account do.	2 13 4
	<hr/>
	989 4 11

RENFREWSHIRE PERPETUAL GOLD CHALLENGE CUP FUND—

£668 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	£607 17 7
£100 3 per cent Savings Bonds, 1955-65, at 101½	101 12 6
Sum on Deposit Receipt with British Linen Bank	189 0 7
Do. Current Account do.	2 9 4
	<hr/>
	851 0 0

WILLIAM TAYLOR MEMORIAL PRIZE FUND—

£401 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	£364 18 2
£100 3 per cent Savings Bonds, 1955-65, at 101½	101 12 6
Sum on Deposit Receipt with British Linen Bank	103 2 1
Do. Current Account do.	1 19 10
	<hr/>
	571 12 7

WILLIAM DUTHIE PERPETUAL SILVER CHALLENGE CUP FUND—

£260 2½ per cent Consolidated Stock, at 91	£234 0 0
Sum on Deposit Receipt with British Linen Bank	39 2 3
Do. Current Account do.	0 13 2
	<hr/>
	273 15 5

THE JAMES ARCHIBALD PRIZE—

£612, 1s. 6d. 3½ per cent War Loan, at 102½	£629 13 5
Sum on Deposit Receipt with Royal Bank of Scotland	118 8 2
Do. Current Account do.	2 1 1
	<hr/>
	750 2 8

KINMONTH GOLD QUACH FUND—

£46, 13s. 6d. 3½ per cent War Loan, at 102½	£48 4 4
Sum on Deposit Receipt with British Linen Bank	9 13 0
Do. Current Account do.	0 2 6
	<hr/>
	57 19 10

" DUTHIE " PRIZE FUND—

£1020 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 91	£928 2 0
Sum on Current Account with Royal Bank of Scotland	12 6 5
	<hr/>
	940 8 5

AMOUNT OF SPECIAL FUNDS . . . £5,905 9 1

EDINBURGH, 9th January 1946.—As Auditor of the Highland and Agricultural Society of Scotland, I have examined the Securities for the Investments as detailed in the above State of the Funds and have found them in order. The Titles to the Heritable Estate and the Bond for Sum lent on Heritable Security are certified by the Society's Law Agents to be in order.

GEO. JAMES GREGOR, C.A.

HOME, Treasurer.

JAMES R. LUMSDEN, Chairman of Board of Directors.

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE,

1. BALANCES at 30th November 1944	£1,128 16 11
2. ARREARS of Subscriptions outstanding at 30th November 1944	£134 14 6
Whereof due by Members who have com- pounded for life, and whose arrears are thereby extinguished.	22 10 0
	<hr/> 112 4 6
3. INTEREST AND DIVIDENDS—	
(1) Interest—	
On Heritable Bond, less Income-tax	£40 12 6
On Railway Debenture and Preference Stocks, do.	920 0 0
On Colonial Government Stocks, do.	109 12 0
On British Government Stocks, do.	1,625 8 2
On Deposit Receipts	14 9 3
	<hr/> £2,710 1 11
(2) Dividends on Bank Stocks, less Income-tax	913 10 0
	<hr/> 3,623 11 11
4. SUBSCRIPTIONS—	
Annual Subscriptions	£1,132 9 0
Life Subscriptions	1,239 0 0
	<hr/> 2,371 9 0
5. 'TRANSACTIONS'—Miscellaneous Sales and other Receipts	38 1 0
6. INCOME-TAX repaid for year to 5th April 1945	2,744 7 9
7. N.D.D. EXAMINATION at Auchincruive, 1944—Refund of Expenses	128 11 6
8. N.D.A. EXAMINATION, 1944—Refund of Expenses	45 13 0
9. UPLIFTED from Deposit Receipt	1,000 0 0
10. MISCELLANEOUS	19 0 0
SUM OF CHARGE	<hr/> £11,211 15 7

EDINBURGH, 9th January 1946.—As Auditor of the Highland and Agricultural of the Society for the year ending 30th November 1945 and have found them to be Accounts I have prepared an Account of Charge and Discharge of the Intremissions 1945, of which the above is an Abstract.

AGRICULTURAL SOCIETY of SCOTLAND for Year 1944-1945.

DISCHARGE.

1. ESTABLISHMENT EXPENSES—		
Salaries and Wages and Allowance for Cleaning	£3,048	9 11
Allowance to Mrs Cowie	100	0 0
Fee-duty, £14, 11s. 8d.; Rates and Taxes, £109, 19s. 0d.	124	10 8
Coal, Gas, and Electric Light	80	16 6
Insurances, £66, 8s. 8d.; Special Annuity Premium, £51, 8s. 9d.; Super-annuation Scheme, £105, 16s. 0d.; Telephone and Telegrams, £77, 13s. 10d.; Repairs and Furnishings, £97, 1s. 8d.	898	3 11
	£3,752	1 0
Less: Income-tax retained and due to Inland Revenue	75	0 0
	£3,677	1 0
2. FEE to Auditor of Accounts for 1943-1944	120	0 0
3. EDUCATION—N.D.A. Examination, 1945	30	9 0
4. CHEMICAL DEPARTMENT—		
Fee to Chemist	£100	0 0
Analyses for Members and Expenses	174	2 2
	274	2 2
5. VETERINARY DEPARTMENT—Medals to Students	48	18 6
6. DAIRY DEPARTMENT—N.D.D. Examination, 1944	86	14 7
7. DAIRY DEPARTMENT, 1945—		
Expenses of N.D.D. Examination held at Auchincruive	£392	10 3
Less Entry Fees	176	8 0
	216	2 3
8. SOCIETY'S 'TRANSACTIONS'	1,155	3 11
9. ORDINARY Printing, £94, 18s. 1d.; Advertising, £41, 8s. 9d.; Stationery, Books, &c., £103, 1s. 7d.; Postages and Receipt Stamps, £105, 0s. 0d.	344	3 5
10. RETIRING Allowance to Professor Stanfield, Consulting Engineer	150	0 0
11. MISCELLANEOUS Payments	247	2 8
12. GRANTS to Local Societies, 1944	192	19 11
13. CERTIFICATES and Medals for Long Service	181	15 3
14. SPECIAL GRANTS—		
Animal Diseases Research Association, £200; Glasgow Veterinary College, £150; Royal Scottish Agricultural Benevolent Institution, £100; Scottish Agricultural Organisation Society, £100; Scottish Red Cross Agriculture Fund, £184, 19s. 2d.; other Grants, £97, 2s. 0d.	832	1 2
15. EXPENSES in connection with Show Plant, &c.	74	12 9
16. PLACED on Deposit Receipt	2,000	0 0
17. ARREARS removed from Subscription List at 30th November 1945	34	19 6
18. ARREARS of Subscriptions outstanding at 30th November 1945	97	1 0
19. BALANCES at 30th November 1945—		
On Account Current with Royal Bank of Scotland—		
Edinburgh Account	£1,241	12 6
In hands of Secretary	206	16 0
	1,448	8 6
SUM OF DISCHARGE	£11,211	15 7

Society of Scotland, I beg to report that I have examined the Books and Accounts correctly stated and sufficiently vouched and instructed. From the Books and of the Treasurer with the Funds of the Society for the year ending 30th November
GEO. JAMES GREGOR, C.A.

HOME, Treasurer.

JAMES R. LUMSDEN, Chairman of Board of Directors.

ABSTRACT of the ACCOUNTS of the CHARGE.

I. FUNDS at 30th November 1944—

£3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock	£2,650 0 0
£5,551, 16s. 3d. 3½ per cent Conversion Stock	4,216 18 2
£500 Queensland 3½ per cent Inscribed Stock, 1950-70	450 1 0
£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock	611 10 6
£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock	259 1 11
£400 3 per cent Savings Bonds, "A," 1955-65	400 0 0
	<hr/>
	£8,587 11 7
BALANCES with Royal Bank of Scotland—	
On Account Current	£53 1 11
On Deposit Receipt	515 0 0
	<hr/>
	568 1 11
	<hr/>
	£9,155 13 6

II. INTEREST ON INVESTMENTS—

On £3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock, for year to 30th June 1945	£95 15 10
Less tax	47 17 10
	<hr/>
	£47 18 0
On £5,551, 16s. 3d. 3½ per cent Conversion Stock, for year to 1st October 1945	£194 6 2
Less tax	97 3 0
	<hr/>
	97 3 2
On £500 Queensland 3½ per cent Inscribed Stock, 1950-70, for year to 1st July 1945	£17 10 0
Less tax	8 15 0
	<hr/>
	8 15 0
On £412 London Midland and Scottish Rail- way Company 4 per cent Debenture Stock, for year to 30th June 1945	£16 9 6
Less tax	8 4 10
	<hr/>
	8 4 8
On £190 London Midland and Scottish Rail- way Company 4 per cent Guaranteed Stock, for year to 30th June 1945	£7 12 0
Less tax	3 16 0
	<hr/>
	3 16 0
On £400 3 per cent Savings Bonds, "A," 1955-65, for year to 15th August 1945	£12 0 0
Less tax	6 0 0
	<hr/>
	6 0 0
	<hr/>
	171 16 10
III. INTEREST ON DEPOSIT RECEIPT	9 2 11
IV. INCOME-TAX repaid for year to 5th April 1945	171 16 8
	<hr/>
SUM OF CHARGE	£9,508 9 11

ARGYLL NAVAL FUND for the Year 1944-1945.

DISCHARGE.

I. ALLOWANCES to four Recipients as follows:—

4 at £60	£240 0 0
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II. EXPENSES of Administration—

Printing revised Booklets	7 5 0
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III. FUNDS at 30th November 1945—

£3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock .	£2,650 0 0
---	------------

£5,551, 16s. 3d. 3½ per cent Conversion Stock .	4,216 18 2
---	------------

£500 Queensland 3½ per cent Inscribed Stock, 1950-70	450 1 0
---	---------

£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock .	611 10 6
--	----------

£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock .	259 1 11
---	----------

£400 3 per cent Savings Bonds, "A," 1955-65 .	400 0 0
	<u>£8,587 11 7</u>

Note.—The above Funds are entered at cost price. The market value at 30th November 1945 was £10,224, 9s. 5d.

Balances with Royal Bank of Scotland—

On Account Current	£58 13 4	
On Deposit Receipt	615 0 0	
	<u>673 13 4</u>	9,261 4 11
SUM OF DISCHARGE		<u>£9,508 9 11</u>

HOME, *Treasurer.*JAMES R. LUMSDEN, *Chairman of Board of Directors.*GEO. JAMES GREGOR, C.A., *Auditor.*

VIEW OF RECEIPTS AND PAYMENTS for Year 1944-1945.**RECEIPTS.**

INTEREST AND DIVIDENDS	£3,623 11 11
INCOME-TAX REPAID for year to 5th April 1945	2,744 7 9
	<hr/>
	£6,367 19 8
ANNUAL SUBSCRIPTIONS AND ARREARS received	1,112 13 0
	<hr/>
	£7,480 12 8

PAYMENTS.

ESTABLISHMENT EXPENSES (see page 235)	£3,677 1 0
FEE TO AUDITOR for 1943-1944	120 0 0
CHEMICAL DEPARTMENT	274 2 2
VETERINARY DEPARTMENT	48 18 6
EDUCATION	159 1 4
RETIRING ALLOWANCE TO CONSULTING ENGINEER	150 0 0
SOCIETY'S 'TRANSACTIONS'	1,117 2 11
ORDINARY Printing, Stationery, Advertising, and Miscellaneous Accounts	646 18 10
GRANTS TO LOCAL SOCIETIES, &c.	374 15 2
	<hr/>
	£6,567 19 11
<i>Extraordinary Expenditure—</i>	
Special Grants (see page 235)	832 1 2
	<hr/>
	7,400 1 1
	<hr/>
SURPLUS	£80 11 7
<i>Extraordinary Income—</i>	
Life Subscriptions	1,239 0 0
	<hr/>
EXCESS OF RECEIPTS	£1,319 11 7
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HOME, *Treasurer.*JAMES R. LUMSDEN, *Chairman of Board of Directors.*GEO. JAMES GREGOR, C.A., *Auditor.*

EDINBURGH, 9th January 1946.

Linlithgow Library.
Imperial Agricultural Research Institute,
 New Dalkeith.

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 6TH JUNE 1945.

• Mr JAMES R. LUMSDEN of Arden, Dumbartonshire, in the Chair.

Present.—Ordinary Directors—Mr R. Scott Aiton; Mr J. W. Alexander, M.V.O.; Mr William Allison; Mr William Brown; Mr W. J. Campbell; Mr James Clark; Captain James Craig; Mr James Durno; The Earl of Elgin and Kincardine, K.T., C.M.C.; Mr Alexander Forbes; Mr J. E. Kerr; Mr William H. Lawson; Mr Robert W. Meikle; Mr William Montgomery; Mr John Niven; Captain Ian S. Robertson; Sir Joshua Ross-Taylor; Mr W. D. Simpson; Mr Matthew Templeton; Mr James Wylie. *Extraordinary Directors*—Major R. F. Brebner, C.B.E.; Mr Alexander Clark; Mr Peter Gordon; Mr George Grant; Mr Thomas Hutchison; Mr James Kilpatrick; Mr James R. Lumsden; Mr James Paton. *Hon. Secretary*—Mr Alexander Murdoch.

The late Colonel F. J. Carruthers, C.B., of Dormont.

Before proceeding with the business of the Meeting, the Chairman said it was with the deepest regret that he referred to the death of Colonel F. J. Carruthers of Dormont. Colonel Carruthers' membership of the Society, he said, dated from 1896, and he had been a Director of the Society from 1907 to 1944, having served as a member of the Board for thirty-seven years. He was Chairman in 1925-26 and 1926-27, and a Vice-President in 1915, 1916, and 1938. He was Convener of the Education Committee for twenty years, and for over seventeen years Convener of the Publications Committee. He represented the Society for many years on the National Agricultural and Dairy Examination Boards, and was Chairman of these Boards on several occasions.

In January 1929 he was appointed Honorary Secretary of the Society, and served in that capacity for sixteen years until his resignation in November 1944. In accepting that resignation the Chairman of the Board expressed the feelings of the Directors when he said that probably no one had rendered more valuable service to the Society.

Throughout his term of office Colonel Carruthers took the deepest interest in the affairs of the Society. It might truly be said that his work for the Society constituted a unique record of long and loyal service. He was unremitting in his efforts to promote in every way the interests of the Society. No one was more conversant with its traditions or more zealous in maintaining its honourable record. At their Meetings they had been impressed by his ready grasp of the questions under discussion and the clearness and directness of the views which he expressed in the course of their deliberations.

Apart from his connection with that Society, he was widely known throughout the country as an agriculturist and breeder of Galloway cattle. On retiring from the Army he conducted his Home Farm at Dormont on modern scientific lines and took a leading part in the public affairs of the County of Dumfries. In 1936 he was appointed Lord-Lieutenant of the County. In that capacity, and in the many departments of public life, agricultural, educational, and military, he rendered most valuable service to the County.

His clear judgment and wise counsel would be greatly missed at the Meetings of that Board, and his place would not readily be filled. His death was a loss to the Society and to the country which they deeply deplored.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy thereof to the widow and family of the deceased.

The late Mr Hugh Martin, Flowerdale.

The Chairman also referred, with very deep regret, to the death of a former member of that Board, Mr Hugh Martin, Flowerdale, Kinrossie. Mr Martin, he said, joined the Society in 1896, and was elected a Director in June 1915 to fill the vacancy in the representation of the Perth Division caused by the death of the late Mr W. S. Ferguson, Pictstonhill. He continued as a member of the Board up till 1922, and was again an Extraordinary Director in 1924 on the occasion of the Perth Show in that year.

Mr Martin took a keen practical interest in the work of the Society, and was a familiar figure at the Annual Shows, at which he rendered valuable services to the Society in various capacities. For over half a century he was a prominent figure in the agricultural life of Perthshire. In addition to his farming activities he found time to take an active part in public affairs, and in all these his shrewd judgment and genial personality earned

for him the warm regard of all with whom he was associated. His death was a loss to the Society which they deeply regretted.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy thereof to the family of the deceased.

Scottish Red Cross Agriculture Fund.

Major R. F. Brobner, C.B.E., Vice-Chairman of the Fund Committee, stated that, as the Fund in England was being closed, it was proposed to bring the Fund in Scotland also to a close. If it were found possible to hold a Show in 1948, the Society's staff would be unable to carry on the work of the Fund and also the work connected with the Show. The Finance Committee had considered the matter that morning, and had decided to recommend that the Scottish Fund be closed.

Grants Confirmed.

On the motion of the Chairman, in the absence of the Treasurer, the following proposed grants, approved of at last Meeting, were confirmed :—

Animal Diseases Research Association—£200 for the current year.

Glasgow Veterinary College—£150 for the current year.

First Post-War Show at Inverness.

The Chairman explained that the Secretary had been in touch with the various Government Departments regarding the holding of a Show in 1946. At present the indications were that it would be difficult to hold a Show. They hoped, however, that by the autumn the situation would have improved, and restrictions would have been removed to such an extent that it would be possible to proceed with the necessary arrangements. He suggested they should appoint a small Committee to keep in touch with the various authorities, and to inspect the showground at Inverness with a view to making a report to the meeting of the Board in November. The question of the appointment of a Master of Works would also require to be considered, and if it was agreed to appoint a small Committee he suggested that that matter be also remitted to them.

The Secretary reported the result of various inquiries which he had made. The canvas contractors said it was impossible now to get flax and there was very little hope of cotton being released. All the timber in the country belonged to the Government, and could only be released under licence. The position with regard to man-power was bad. It was stated that there was no hope of labour and materials being available for the Show without special Government permission or licence, and that that permission would be difficult to get. Further, under present regulations, the Showyard Erector could not send his workmen more than ten miles out of Aberdeen. With regard to the catering position, one of the Society's caterers, the Royal Athenæum, Aberdeen, said the position was extremely difficult, and that they would probably have to rely entirely on unrationed foods.

After some discussion the suggestion made by the Chairman was agreed to, and the following Committee was appointed to watch developments, and with powers to appoint a Master of Works if thought necessary, and to take whatever action they considered desirable : Mr James R. Lumsden (*Chairman*) ; Major R. F. Brehner, C.B.E. ; Mr Ian M. Campbell ; Mr James Durno ; Mr Alexander Murdoch ; Mr James Paton ; Captain Ian S. Robertson ; Sir Joshua Ross-Taylor ; Mr Francis W. Walker.

Colouring Matter in Sheep Dips.

A Report was submitted by Mr J. W. Alexander, M.V.O., who represented the Society at a Meeting on 11th April called by the National Farmers' Union and Chamber of Agriculture on the use of colouring matter in sheep dips. At that Meeting the Chairman, Mr Rennie, submitted the following motion which had been approved by the Live Stock Committee of the Union and Chamber—viz. : "That legislation be required to prohibit the manufacture or use of sheep dips containing colouring matter which will not scour out of the wool in the normal trade process of scouring." At the end of a long discussion the representatives of the Blackface and Cheviot Sheep Societies indicated that they would recommend their Societies to accept the motion. The representative of the Society of Border Leicester Sheep Breeders, on the other hand, wished no interference with the present practice. Mr Alexander, in view of his instructions from this Society that it desired the use of all colouring matter prohibited, said he could not agree to the motion.

The Chairman of the meeting then suggested that, as there was no likelihood of any legislation until after the General Election and it was undesirable that a decision which was not unanimous should go out from that meeting, the Border Leicester Society's representative and Mr Alexander should submit the above motion to their Societies with a view to ascertaining whether they would be prepared to accept it.

Mr Alexander, adding to his report, said that after the meeting he had a talk with the Chairman, Mr Rennie, who thought that to prohibit the manufacture or use of sheep dips containing colouring matter was to take too big a step at one time. If the Society adopted the Union and Chamber motion, probably at a later date, the total prohibition of colouring matter would be approved.

Captain James Craig, Crieff, said that if they wished to get unanimity in this matter—and it was important that they should do so—they should accept the motion. In it they were getting an important point for which they had been fighting, that no colouring matter which would not scour out of the wool would be allowed. Provided colouring matter would scour out of the fleece, he thought there was no great objection to a certain amount of colouring.

The meeting then agreed that Mr Alexander be authorised to say that the Directors approved of the Union and Chamber motion.

Committee on Agricultural Education in Scotland.

The Chairman reported that, along with Sir Joshua Ross-Taylor and the Secretary, he had attended a Meeting of the Alness Committee on 12th April, when they had submitted evidence on the lines decided upon at the last Meeting of the Board.

Finance.

A Minute of Meeting of Committee, dated 6th June, was submitted and approved.

The Minute dealt with the following matters:—

Edinburgh Highland Reel and Strathspey Society.—It was recommended that the grant of £50, together with the additional grant of £25 given during the past five years, be renewed for the current year.

Staff Changes.—The Secretary reported that Mr J. J. Blake had intimated his desire to resign, but was prepared to carry on his duties until a successor was appointed. Mr Blake had been in the service of the Society for over twenty years. It was decided to recommend that he be granted a retiring allowance of £75 per annum.

The Secretary further reported that he had communicated with Mr Harry F. Currie, who was at present a Technical Sergeant in a Tank Regiment in Germany, and who had served in a clerical capacity in the Society's office during several Shows and at other periods. Mr Currie was desirous that his name should be considered as an applicant for the vacant post. It was decided to recommend that the Secretary be empowered to engage him at a commencing salary of £300 per annum.

Offer of Oil Paintings.—A letter was submitted from the Duke of Montrose intimating that the Duchess of Montrose wished to inquire whether the Society would care to take two pictures (oil paintings) that belonged to her father, the XIIth Duke of Hamilton. The pictures represented the Clydesdale stallion "Sir Walter Scott" and the Ayrshire bull "Sir Colin Campbell." Both animals, it was understood, were well-known winners in their day.

It was decided to recommend that this offer be accepted, and that the Society's cordial thanks be conveyed to the Duchess of Montrose.

MEETING OF DIRECTORS, 7TH NOVEMBER 1945.

Mr JAMES R. LUMSDEN of Arden, Dumbartonshire, in the Chair.

Present.—Ordinary Directors—Mr R. Scott Aiton; Mr J. W. Alexander, M.V.O.; Mr William Allison; Mr William Brown; Mr W. J. Campbell; Mr Peter W. Crawford; Mr James Durno; Mr Alexander Forbes; Mr George Grant; Mr James Johnston; Mr J. E. Kerr; Mr James Kilpatrick; Mr William H. Lawson; Mr James M'Laren; Mr Ian C. Menzies, O.B.E.; Mr Adam W. Montgomerie, O.B.E.; Mr William Montgomery; Mr John N. Reid; Sir Joshua Ross-Taylor; Mr W. D. Simpson; Mr Matthew Tompleton; Captain R. J. Thomson; Mr Francis W. Walker; Mr James Withers. *Extraordinary Directors*—Major R. F. Brebner, C.B.E.; Major A. D. Campbell; Mr Alexander Cormack; Mr William I. Elliot; Mr James R. Lumsden; Captain R. Maclean; Mr Andrew R. Page; Mr James Paton; Mr Richard J. Singer, F.I.A. (Scot.); Mr James Wyllie. *Hon. Secretary*—Mr Alexander Murdoch.

The late Mr John P. Sleigh.

Before proceeding with the business of the Meeting the Chairman referred, with very deep regret, to the death of Mr John P. Sleigh of St John's Wells, Fyvie, a member of the Board. In the death of Mr Sleigh, he said, the Society had lost one of its oldest and most loyal supporters. His membership of the Society extended over a period of fifty

years, during twenty-eight of which he served as a member of the Board of Directors. He took a keen interest in the affairs of the Society, especially in connection with the Annual Show, at which he was a regular exhibitor, and at which he acted as Assistant Steward of Horses for many years. He was widely known as a breeder of Clydesdale horses, having bred many horses which maintained the highest traditions of the breed, not only at home but in the Dominions and foreign countries.

Mr Sleigh took an active part in the work of many public bodies in Aberdeenshire. He was always a generous supporter of any good cause. During the war years he acted as Convener of the Turriff Area Committee, which raised the remarkable total of over £16,000 for the Scottish Red Cross Agriculture Fund.

As a member of that Board he was esteemed and respected on account of his kindly disposition and quiet and unassuming manner. His death was a loss to the Society which they deeply regretted.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the widow and family of the deceased.

The late Mr Alexander Niven.

The Chairman also referred, with deep regret, to the death of a former member of the Board, Mr Alexander Niven, formerly of Collairnie and Ayton, Fife, and latterly of Milnegraden East Mains, Coldstream.

Mr Niven, he said, had been a member of the Society for over forty years. He was an Extraordinary Director in 1924, being the year of the Annual Show at Perth, and an Ordinary Director from 1926 to 1930. He was well known as a successful breeder of Clydesdale horses and Border Leicester sheep. For several years, while he farmed at Collairnie and Ayton, horses and sheep bred by him secured the highest honours at local and national shows.

He gave valuable service on many public bodies, and earned the esteem and regard of his colleagues for his sound judgment and wise counsel. His death was a loss which was deeply regretted by a wide circle of friends.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the widow and family of the deceased.

Chairman of the Board for 1945-46.

Major R. F. Brebner, C.B.E., The Leuchold, Dalmeny, moved that Mr James R. Lumsden of Arden, Dumbartonshire, be re-elected Chairman of the Board of Directors for the ensuing year.

Mr Alexander Murdoch, East Hallside, Cambuslang, seconded, and the motion was unanimously adopted.

Mr Lumsden, in accepting office, thanked the Directors for the honour they had done him in re-electing him Chairman of the Board.

Vacancy on Board.

The Chairman pointed out that a vacancy had occurred in the list of Extraordinary Directors through the death of Mr John P. Sleigh of St John's Wells, Fyvie.

It was unanimously decided to recommend that Mr J. Milne Henderson, 15 Merchiston Park, Edinburgh, be nominated for election at the General Meeting in January to fill the vacancy.

Proposed Implement Exhibition in 1946.

A letter was read from Mr Thomas Hutchison, Aberdeen, in which he suggested, in view of the fact that no Show was likely to be held in 1946, that the Society organise an Implement Exhibition something on the lines of that so successfully staged at Castleton last year.

Sir Joshua Ross-Taylor, Mungoswalls, Duns, Convener of the Implements and Machinery Committee, while agreeing that it was desirable that something should be done to retain the interest of members of the Society, said he was very doubtful if anything in the way of a Machinery Exhibition alone would have the desired effect. They were now entirely dependent on machines that could be produced in this country, and could not expect to get any imported machinery from across the Atlantic. He questioned very much if the average member or farmer in Scotland would go far to see an exhibition of implements which he not only already knew, but in many cases had already working at home.

Mr William Montgomery, Banks, Kirkeudbright, said it was only certain people who had these implements. If the implement makers were agreeable to have a demonstration of implements, or a show of implements, say, in the Kelvin Hall, Glasgow, he thought the idea should be encouraged.

After some further discussion, it was eventually agreed that a decision on Mr Hutchison's proposal be delayed until the next Meeting of the Board.

Scottish Red Cross Agriculture Fund.

Major R. F. Brebner, C.B.E., in submitting a Report on the progress of the Fund since the date of their last Meeting on 6th June, stated that the Annual Meeting of the Committee of the Fund had been held on 20th July, when it was reported that the total raised during the fifth year amounted to a sum of £213,420, 19s. 7d. This exceeded the previous highest total raised in the preceding year by about £42,000. The aggregate total for the five years amounted to £762,525, 0s. 6d.

The appeal had been closed at 30th June, in conformity with the decision to close the Duke of Gloucester's Fund. In view, however, of the short notice of closure given by the Duke of Gloucester's Fund, and in accordance with the decision of the corresponding Fund in England, it was decided to keep the Scottish Fund open in the meantime for the purpose of ingathering various balances in the hands of the Area Committees, the proceeds of Victory Garden Shows which had been arranged, and the recovery of income tax receivable under Deeds of Covenant. Once all these were collected and received the Fund would be finally closed.

The total for the six months up to that date had just passed the £10,000 mark, which was quite a worthy addition to the main total of £762,525.

The Chairman, Mr Lumsden, expressed the congratulations of the Board to the Committee of the Fund on the great success of their efforts in aid of the Red Cross.

Gift of Victory Lamp.

The Chairman then reported that, when in London recently, he had received, on behalf of the Society, the gift of a Victory Lamp from the Chairman's Committee of the Red Cross Agriculture Fund in England. The lamp, which was on view, bore the following inscription: "Victory Lamp, Replica of Florence Nightingale's Lamp, presented by the Chairman's Committee of the Red Cross Agriculture Fund to the Highland and Agricultural Society of Scotland, in recognition of most generous help."

The Chairman said he thought it would be the Board's wish that the lamp should be hung in a conspicuous position in the Society's Chambers, and this was unanimously agreed to.

First Post-War Show at Inverness.

A Minute of Meeting of Special Committee, dated 7th November, stated that, from information received from the Royal Agricultural Society of England, it was learned that a deputation from that Society had waited upon the Minister of Agriculture (Mr Tom Williams) on 24th August. The purpose of the deputation was to obtain the approval and support of the Minister to proposed applications to the various Ministries for priority licences for labour, materials, transport, &c. The members of the deputation stressed the great importance, in the national and imperial interest, of a resumption of the Royal Show in 1946. While fully appreciating the difficulties, they urged very strongly that it was undesirable that the Show should be deferred until 1947.

The Minister, in reply, expressed regret that he was unable to agree to their request. On the general question of labour for a Royal Show in 1946, he reminded the deputation that the demand of the nation was for houses. If many capable joiners and builders' workmen were employed on work for an Agricultural Show, it would undoubtedly cause an outcry and would be very bad for agriculture. With armies returning, and with the change over from munitions to civilian industries, transport for some time to come would be more difficult even than it had been in the first half of that year, and a Show would involve the transport of large numbers of people and animals and much material. Problems of catering for the people and feeding of animals would raise acute difficulties under conditions as they were likely to be next summer. Finally, he strongly advised that between that date and the time when Shows could be resumed, the opportunity should be taken of reviewing the whole purpose and technique of Agricultural Shows in the light of the great experience gained in demonstration work during the war years.

The Secretary of the Department of Agriculture for Scotland, in a letter to the Chairman of Directors, dated 15th September, referred to the above interview, and enclosed a copy of the Minute of Proceedings. From that letter it was gathered that the attitude of the Department of Agriculture was in line with that of the Ministry.

With regard to the proposal that there should be a review of the whole purpose and technique of Agricultural Shows, the Secretary of the Department of Agriculture suggested that it might perhaps be useful for the Department to meet a few representatives of the Society to discuss that aspect of the matter. The date suggested for the proposed meeting was Tuesday, 13th November.

The Special Committee reported that they were unanimously of opinion that, in view of the circumstances above narrated, it would be quite impossible to hold a Show at Inverness in 1946. Every step, however, should be taken to secure facilities for a Show there in 1947.

The Special Committee further recommended that the following representatives of the Society be appointed to meet with representatives of the Department of Agriculture

on Tuesday, 13th November : Mr James R. Lumsden, Mr Alexander Murdoch, Sir Joshua Ross-Taylor, Mr James Paton, Mr Francis W. Walker, and the Secretary.

The Chairman, in moving approval of the Minute, stated that the Special Committee did not in any way agree with the statements which the Minister of Agriculture had made at the Meeting with representatives of the Royal Society. They felt that the Society would require to use every means in its power to secure that facilities would be obtained for a Show in 1947.

The Provost and Town Council of Inverness had gone to considerable trouble and expense in having the ground for the Show in readiness for 1946. They were very much indebted to them for what they had done, and he suggested that a letter of thanks should be sent to them.

Mr Francis W. Walker of Leys, Leys Castle, Inverness, in seconding approval of the Minute, referred to misapprehension as to the real purpose served by Agricultural Shows. He mentioned in particular their great value in the improvement of general farming and live stock, as well as their great educative value, not only for farmers and the general public, but particularly for the employees on the land.

The Minute was then approved. The Secretary was instructed to write a letter expressing the thanks of the Directors to the Provost and Town Council of Inverness for the work they had done in preparing the ground there for the Show.

Inspection of Growing Crops of Potatoes.

Mr James Paton, Kirkness, Glencraig, and Mr W. D. Simpson, Highfield, North Berwick, submitted a Report on the proceedings at a Meeting in connection with the scheme for the Inspection of Growing Crops of Potatoes, held at St Andrew's House on 11th October.

In speaking to the Report, both Mr Paton and Mr Simpson expressed the view that the standard for stock seed potatoes should be raised. The Secretary was accordingly instructed to write to the Department of Agriculture to the effect that the Directors were of opinion that certificates for stock seed should not be granted where the crop had been rogued to an extent exceeding 2.5 per cent before the first inspection took place. This limit of 2.5 per cent might be further reduced as a result of experience in later years.

The Chairman thanked Mr Paton and Mr Simpson for attending the Meeting as the Society's representatives and for their Report.

Housing for Rural Workers.

A letter was submitted from the Scottish Branch of the Land Agents' Society, forwarding copy of a letter which that body had addressed to the Secretary of State for Scotland with regard to the discontinuance of the Housing (Rural Workers) Act, 1926.

Mr Francis W. Walker said that the Minister of Health was reported to have stated in the House of Commons that he hoped to give the country a better Act. The Government should be pressed to disclose its new proposals, because, in the meantime, housing in rural areas was entirely held up. He moved that a letter be sent to the Secretary of State for Scotland urging the desirability of the publication of particulars of the new measure as soon as possible.

This was unanimously agreed to.

Proposed Labelling Bill for Wool Textiles.

A communication was submitted from the National Association of Scottish Woollen Manufacturers with regard to a proposal that a Wool Textiles Labelling Act for the United Kingdom be applied for, and inviting representatives of the Society to attend a Meeting of the Association on 23rd November.

It was decided that the Society be represented at the Meeting by Mr J. W. Alexander, M.V.O.; Captain James Craig; and Mr William I. Elliot.

Cattle Exhibits at Show.

Mr William D. Simpson, Highfield, North Berwick, raised a question as to when the Directors were going to consider the question of requiring that cattle exhibits at the Society's Annual Show should be tuberculin tested or from attested or supervised herds. If something were not done, there might be no attested cattle at the Show.

On the suggestion of the Chairman, it was agreed that the matter be placed on the Agenda for next Meeting of the Board.

Question of a Permanent Showground.

Mr James Wither, Awhirk, Stranraer, raised the question of a permanent Showground for the Society's Shows, and gave notice of the following motion which he would move at next Meeting of the Board :—

"That the Directors consider as to the desirability, or otherwise, of acquiring a permanent site for the Annual Show."

Finance.

A Minute of Meeting of Committee, dated 7th November, was submitted and approved. The Minute dealt with the following matters :—

Members' Subscriptions.—The Secretary reported that, at that date, the amount received from members in Life subscriptions was about £400 less than the total received for the preceding year. There was also a slight falling off in annual subscriptions of about £180. Ninety-three members were on service with His Majesty's Forces, and, in accordance with the decision of the Directors, were retained on the Roll of Members without payment of subscriptions.

Scottish Agricultural Organisation Society Ltd.—It was recommended that the grant of £100 to the Scottish Agricultural Organisation Society Ltd. be again renewed for the year 1946.

Royal Scottish Agricultural Benevolent Institution.—It was recommended that the grant of £100 to the Royal Scottish Agricultural Benevolent Institution be renewed for the year 1946.

Scottish Primary Products Competition.—In July a letter was received from the Scottish Education Department inquiring as to whether the Society would be prepared to contribute a sum not exceeding £100 towards the expenses of the Competition in 1946. In the absence of a Meeting of the Board, the Finance Committee had decided to comply with the suggestion, and had notified the Department accordingly. The approval of the Directors was asked to the action taken by the Finance Committee.

MEETING OF DIRECTORS, 9TH JANUARY 1946.

Mr JAMES R. LUMSDEN of Arden, Dumbartonshire, in the Chair.

Present.—Ordinary Directors—Mr R. Scott Aiton; Mr J. W. Alexander, M.V.O.; Mr William Allison; Mr W. J. Campbell; Mr James Clark; Captain James Craig; Mr Peter W. Crawford; Mr James Durno; Mr Alexander Forbes; Mr George Grant; Mr J. E. Kerr; Mr James Kilpatrick; Mr James M'Laren; Mr Ian C. Menzies, O.B.E.; Mr Adam W. Montgomerie, O.B.E.; Mr William Montgomery; Mr John Niven; Captain Ian S. Robertson; Sir Joshua Ross-Taylor; Mr W. D. Simpson; Mr Matthew Templeton; Mr Francis W. Walker; Mr James Withers. *Extraordinary Directors*—Major R. F. Brebner, C.B.E.; Mr Alexander Cormack; Mr William I. Elliot; Mr John Kerr; Mr James R. Lumsden; Mr James Paton; Mr Richard J. Singer, F.I.A. (Scot.); Mr Andrew Wilson; Mr James Wyllie. *Treasurer*—The Earl of Home, K.T. *Hon. Secretary*—Mr Alexander Murdoch. *Auditor*—Mr George James Gregor, C.A.

The late Dr J. F. Tocher.

Before proceeding with the business of the Meeting, the Chairman said it was with very deep regret that he had to refer to the death of Dr J. F. Tocher, Consulting Chemist to the Society, which took place at Aberdeen on 8th November. Dr Tocher, he said, had occupied the office of Consulting Chemist since January 1913, a period of thirty-three years.

Throughout his long term of office Dr Tocher rendered valuable services to the Society. Besides his analytical and advisory work on behalf of members, he conducted important investigations on behalf of the Society and published numerous scientific reports. He was a recognised authority on all questions relating to milk yields and milk analysis.

Dr Tocher was a man of great natural ability and versatile gifts. Not only was he a brilliant scientist, but he was also distinguished as a man of letters and as a local historian. He was Lecturer in Statistics in the University of Aberdeen, and had carried out an extensive survey of the physical characteristics of the people of Scotland. He served on many public bodies, including the Board of Governors of the North of Scotland College of Agriculture, on which he represented the Society for thirty years, and he acted as Examiner on many occasions for both the National Diploma in Agriculture and the National Diploma in Dairying.

Dr Tocher's great services to science, to the North-East of Scotland, and to the country generally, brought him well-deserved academic and other honours, and his kindly nature and charm of manner won for him a wide circle of friends, by whom he was held in the highest admiration and esteem. They mourned his loss, not only as a devoted servant of the Society, but as a distinguished exponent of science in its application to the practice of agriculture.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the family of the deceased.

The late Mr R. A. Smith, Wester Lovat.

The Chairman also referred, with deep regret, to the death of a former member of the Board, Mr R. A. Smith, Wester Lovat, Beauly. Mr Smith's membership of the Society, he said, covered a period of over forty-five years, and he served as a Director from 1919 to 1923.

As a farmer, as a breeder of Shorthorn cattle, and as a valuator and arbitrator, he was well known and highly esteemed throughout the North of Scotland. For nearly half a century he farmed at Wester Lovat with outstanding success. Not only as an arable farmer did he excel—he established a herd of Shorthorn cattle at Wester Lovat which produced many notable examples of the breed.

In the North of Scotland his services as a valuator, both of farm crops and stock, had been in constant demand, and he carried out arbitrations on an extensive scale. In all that work his knowledge and sound judgment, combined with his fairness and integrity of character, earned for him the confidence and high regard of the agricultural community.

In addition to his farming activities Mr Smith took an active interest in public affairs and served on many public bodies. His death was a loss to the North, and to agriculture in general, which they deeply deplored.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the family of the deceased.

Scottish Agricultural Organisation Society.

On the motion of the Earl of Home, K.T., Treasurer, it was unanimously agreed to confirm the proposed grant of £100 to the Scottish Agricultural Organisation Society for the year 1946.

Royal Scottish Agricultural Benevolent Institution.

On the motion of the Earl of Home, K.T., it was also agreed to confirm the proposed grant of £100 to the Royal Scottish Agricultural Benevolent Institution for the year 1946.

Proposed Labelling Bill for Wool Textiles.

A Report by Mr J. W. Alexander, M.V.O., Moffat, was submitted on the proceedings at a meeting called by the National Association of Scottish Woollen Manufacturers, held on 23rd November, in connection with a proposed Labelling Bill for Wool Textiles. The Society's representatives at the meeting were Mr Alexander and Mr William I. Elliot, Middelton, and other bodies represented were the National Farmers' Union and Chamber of Agriculture of Scotland and Messrs Patons & Baldwins, Ltd. The object of the proposed Bill was to ensure that the description "all wool" should be applied only to cloth made of wool alone or with a certain limited percentage of other material. From the discussion which took place it appeared that, amongst the cheaper cloths, there was considerable adulteration (up to very high percentages) with cotton, &c., and probably would be with synthetic fibres. These cloths were sold as wool or pure wool. The manufacturers had not yet reached a decision as to the percentage which should be allowed. The Report suggested that the Directors should support the proposal for a Labelling Bill on these lines.

Mr William I. Elliot said that he was in agreement with what Mr Alexander had stated in his Report. The only thing he was in doubt about was the percentage of adulteration which should be allowed in pure woollen garments.

It was unanimously agreed that the proposed Bill should receive the support of the Society. The Chairman thanked Mr Alexander and Mr Elliot for attending the meeting as the Society's representatives.

Hill Sheep Subsidy.

Major R. F. Brebner, C.B.E., reported that, along with Mr J. W. Alexander, M.V.O., he had attended a meeting on 19th December, called by the National Farmers' Union and Chamber of Agriculture of Scotland, with regard to the amount of the Hill Sheep Subsidy for the past year. Delegates from the meeting afterwards met the Department of Agriculture on 20th December. Figures presented by the Union and Chamber representatives brought out that the same amount of subsidy as last year would be required. No decision would be reached until after the English interests had been considered.

Purpose and Technique of Agricultural Shows.

The Chairman reported on the meeting of the Society's representatives with officials of the Department of Agriculture, held on 13th November, to discuss the "purpose and technique of Agricultural Shows." The present Government, he said, were of the opinion that there were too many big Shows going on for more than one day in England, and they possibly thought that this also applied to Scotland. The Department's representatives had agreed that the Society's Show was the only large Show held in Scotland. The only real suggestion that came from the Conference was that the Show might be strengthened on the educational side. Hitherto they had each year an educational exhibit staged by the Agricultural College of the area in which the Show was held. Sir Patrick Laird had suggested that in future the three Agricultural Colleges, along with the Research Institutes, might be asked to combine in making a more comprehensive display every year. It had been suggested also that the Show might become a final meeting-place for winning animals at local Shows, but he was doubtful whether that would be a practicable proposition. These suggestions, however, could be kept in mind when arrangements for future years were being considered.

Mr Francis W. Walker of Leys said that, when the invitation to the meeting was first received, it was felt that there was something wrong with the technique of the Society's Show. On the question being put to Sir Patrick Laird, he had frankly admitted that he could find no fault with the way the Society's Show was run, either in purpose or technique, and that he felt that the criticisms that had been made applied to England rather than to Scotland.

Proposed Implement Exhibition in 1946.

Further consideration was given to the letter, submitted at last meeting from Mr Thomas Hutchison, Aberdeen, in which he suggested that the Society organise an Implement Exhibition in 1946.

Mr William Montgomery, North Milton, Kirkeudbright, said that he had communicated with twenty-two of the larger exhibitors of implements at the Society's Show. He had received sixteen replies, and from these it did not look as if the exhibitors were keen on an exhibition at present. Four were definitely in favour of such an exhibition, six were against—they were too busy and had not the time—and six did not say either one way or the other.

Mr Ian C. Menzies, O.B.E., Broomhills, Liberton, said that the principal implement firms were against such an exhibition because they had their order books full for about two years to come. They needed all their men to deal with these orders and had no men to spare for exhibition purposes.

It was agreed that a reply be sent to Mr Hutchison to the effect that the Directors did not think it was practicable to hold an Implement Exhibition at the present time.

Question of a Permanent Showyard.

Mr James Wither, Awhirk, Stranraer, submitted the following motion, which appeared under his name on the Agenda: "That the Directors consider as to the desirability, or otherwise, of acquiring a permanent site for the Annual Show."

Mr Wither said that his object in submitting the motion was to have the matter discussed rather than to have definite action taken at the present time. There had been great developments in transport in recent years, and there would not be the same difficulty as formerly in bringing stock and visitors to a central Show. He referred to the large sums spent by the Society in pre-war years on the hire of timber and canvas and in loading in supplies of water, gas, and electric current.

The Chairman said there were advantages both ways—in having a permanent Showground and in having the Show going to various centres. His view was that at the present time it would be very difficult for the Society to buy and equip a Showground without sinking all its capital in the venture. It would be too big a risk to take at present costs.

Mr Francis W. Walker of Leys said that if the motion had been to establish a permanent Showyard he would have had no hesitation in moving a direct negative. He thought it would be the biggest mistake that the Society could make to adopt a principle which had been tried by the Royal Agricultural Society of England, and which had brought that Society to the verge of ruin. He was certain that if the Highland Society were to acquire a permanent Showyard—he did not care where it was—it would result in failure. The educational value of the Show would very largely disappear. The fact that it went from area to area gave everyone an opportunity of seeing what was taking place in agriculture, and it also gave the farm-worker an opportunity to see the latest in agricultural methods and machinery.

Mr Alexander Murdoch, East Hallside, Cambuslang, said he did not think this was an opportune time to bring forward the motion. The costs of erecting a permanent

Showyard would be enormous. It was true the Society had invested funds amounting to £200,000, but it should be borne in mind that the Royal Society's experiment at Park Royal involved them in a loss of invested funds amounting to about £300,000.

After some further discussion Mr Wither withdrew his motion, it being understood that he could, if he so desired, again raise the matter on a future occasion.

Attested Cattle at Shows.

Mr W. D. Simpson, Highfield, North Berwick, raised the question of whether there should be a requirement that cattle exhibits at the Society's Show should have passed a tuberculin test or be from licensed, attested, or supervised herds.

In the course of a discussion which followed, Mr A. W. Montgomerie, O.B.E., Westburn Farm, Cambuslang, pointed out that they should take into account also the question of an abortion test.

On the suggestion of the Chairman it was agreed to appoint a Committee, consisting of the following members, to go into the questions raised, and report to a future meeting: Mr J. E. Kerr (*Convener*); Major R. F. Brebner, C.B.E.; Mr James Durno; Mr James Kilpatrick; Mr A. W. Montgomerie, O.B.E.; Sir Joshua Ross-Taylor; Mr Francis W. Walker; and Mr James Wither.

Consulting Chemist.

It was agreed to remit to the Science Committee to consider as to the appointment of a Consulting Chemist in place of the late Dr Tocher, and to report.

Proposed Agricultural Exhibition in Glasgow.

The Chairman reported regarding a movement which was on foot with regard to the holding of an Agricultural Exhibition in the Kelvin Hall, Glasgow, in the autumn of the current year. The exhibition proposed would be on the lines of those held in England during last year, the object being to interest the urban population in agriculture and to promote closer collaboration between agriculture and industry through the medium of practical demonstration and pictorial record. Nothing definite had yet been arranged, but it was probable that the Society might receive an invitation to take part in the discussions at an early date. As no meeting of Directors would be held till 3rd April, he suggested that a Special Committee be appointed to act on behalf of the Society in respect of any proposals which might be received, and this was agreed to. The Committee was then appointed as follows: Mr James R. Lumsden (*Convener*); Mr Alexander Cormack; Mr James Kilpatrick; Mr A. W. Montgomerie, O.B.E.; Mr James Paton; Sir Joshua Ross-Taylor; The Earl of Home, K.T. (*Treasurer*); and Mr Alexander Murdoch (*Honorary Secretary*).

A question then arose as to whether the Committee should be given powers to commit the Society with regard to finance. Major R. F. Brebner moved that such powers be given, and this was seconded by Mr W. D. Simpson.

Mr William I. Elliot moved as an amendment that the Committee be not given financial powers, and this was seconded by Mr J. W. Alexander, M.V.O.

On a vote being taken, 24 voted for the motion and 5 for the amendment.

The motion was therefore declared carried.

MEETING OF DIRECTORS, 3RD APRIL 1946.

Mr JAMES R. LUMSDEN of Arden, Dumbartonshire, in the Chair.

Present.—Ordinary Directors—Mr R. Scott Aiton; Mr J. W. Alexander, M.V.O.; Mr William Allison; Mr W. J. Campbell; Captain James Craig; The Earl of Elgin and Kincardine, K.T., C.M.G.; Mr George Grant; Mr J. E. Kerr; Mr James Kilpatrick; Mr William H. Lawson; Mr Ian C. Menzies, O.B.E.; Mr Adam W. Montgomerie, O.B.E.; Mr William Montgomery; Sir Joshua Ross-Taylor; Mr W. D. Simpson; Captain R. J. Thomson; Mr Thomas A. Wedderspoon; Mr James Wither. *Extraordinary Directors*—Mr D. M. Allan; Mr Alexander Cormack; Mr William I. Elliot; Mr J. Milne Henderson; Mr James R. Lumsden; Captain R. Maclean; Mr James Paton; Mr Richard J. Singer, F.I.A. (Scot.); Mr James Wyllie. *Treasurer*—The Earl of Home, K.T. *Hon. Secretary*—Mr Alexander Murdoch.

James Kilpatrick Trophy.

A letter was submitted from Colonel A. G. Young, Secretary of the Glasgow Agricultural Society, in which he stated that that Society, along with the Clydesdale Horse

Society, had sponsored a testimonial to Mr James Kilpatrick of Craigie Mains. The Testimonial Fund had now been closed, and it was the desire of Mr Kilpatrick that the sum raised should be handed over to the Society to be used in the purchase of a perpetual trophy for competition by entire horses at the Society's Annual Shows. Mr Kilpatrick had suggested that the conditions attached to the competition should be similar to those in force for the Cawdor Cup for males, except that the trophy would be perpetual and could not be won outright by any exhibitor. The sum available was in the neighbourhood of £750, and it was suggested that such amount as was not spent in the actual purchase of the trophy should be funded and the annual interest applied in the purchase of a replica for the winner. If the Society agreed to accept the Fund, it was proposed to hand it over at a function to be held in the Grosvenor Restaurant, Glasgow, on Friday, 24th May, when the presentation would be made to Mr Kilpatrick, who, in turn, would pass over the cheque to the Chairman of the Society.

On the motion of the Chairman, it was unanimously agreed to accept the offer. On behalf of the Directors, he expressed gratification at Mr Kilpatrick's decision that the trophy should be handed to the Society. It would commemorate to the Society and the agricultural community for all time the outstanding work Mr Kilpatrick had done for agriculture in general and the Clydesdale horse breed in particular.

Mr James Kilpatrick thanked the Directors for accepting the trophy. He said he had had great pleasure in exhibiting at the Highland Shows for many years, and he hoped to be spared to see the competition for this trophy.

Inspection of Growing Crops of Potatoes.

Mr James Paton, Kirkness, Glencraig, submitted a Report on the proceedings at a Conference regarding the Scheme for the Inspection of Growing Crops of Potatoes, held at St Andrew's House on 24th January. The other representative of the Society at the Conference was Mr William D. Simpson, Highfield, North Berwick.

Mr Paton recalled that last year they put forward proposals to ensure that no crops of potatoes were eligible for Stock Seed Certificates if they had been subjected to severe roguing before inspection. They were glad to report that the Department now proposed making the standard even more severe than they had suggested. It was, therefore, to be hoped that the crops resulting from the use of stock seed would prove to be of a much higher standard than had been the case in the past.

The Chairman thanked Mr Paton and Mr Simpson for attending the Conference as the Society's representatives and for their interesting Report.

Licensing of Boars.

Mr Ian C. Menzies, O.B.E., Broomhills, Liberton, reported that, along with Mr William D. Simpson, he had attended a meeting at St Andrew's House, on 31st January, to consider the regulations and relative forms relating to the proposed Licensing of Boars. The regulations and forms were prepared by the Department very much on the lines adopted in connection with the Licensing of Bulls. Explanations were given upon various points and observations were made by the representatives of the various Breeders' Associations.

The Secretary reported that, following the meeting, a draft Press Notice was forwarded by the Department for approval. On being submitted to Mr Menzies and Mr Simpson, they agreed that it was in accordance with the decisions arrived at at the meeting.

The Chairman thanked Mr Menzies and Mr Simpson for representing the Society at the meeting, and for their report.

Post-War Wool Marketing.

The Secretary reported that, on 22nd February, he had received a letter from the Scottish Agricultural Organisation Society, Ltd., inviting the Society to be represented at a Conference to be held in Edinburgh on 7th March. The object of the Conference was to consider the recommendations contained in the Report of the Committee appointed under the Chairmanship of Colonel Walter Elliot to consider whether the future marketing of wool grown in Great Britain could be improved by a scheme under the Agricultural Marketing Acts, or by any other means. After consultation with the Chairman of Directors, he had asked Mr J. W. Alexander, M.V.O., Major R. F. Brehner, C.B.E., and Captain James Craig, to attend the Conference as representing the Society.

Mr J. W. Alexander said that he and Captain Craig attended the meeting. There was considerable discussion, and it was decided that a small deputation should be sent to London to interview the Government. Captain Craig was appointed to represent the Society on the deputation.

Captain Craig said he thought that, on the whole, the views of the Joint Wool Committee on the Elliot Report were not at all favourable. A small Committee was appointed

to get in touch with the National Farmers' Union and representatives of Northern Ireland in order to find out whether or not it would be possible to go forward to the Government with joint recommendations. That was the position at the moment.

The Chairman expressed the thanks of the Directors to the Society's representatives.

Consulting Chemist.

A Minute of Meeting of Science Committee, dated 3rd April 1946, was submitted and approved.

The Minute stated that, in accordance with the remit from the Board of Directors, the Committee had considered as to the appointment of a Consulting Chemist to the Society in place of the late Dr J. F. Tocher.

After consideration and discussion, Mr James Wither, Awhirk, Stranraer, had moved that no appointment be made, and this was seconded by Mr William I. Elliot, Middleton, Stow.

Mr Alexander Murdoch, Honorary Secretary, moved, as an amendment, that the vacant post be filled, and Mr James B. Lumsden of Ardon seconded.

On a vote being taken, eight had voted for the amendment and eleven for the motion, which was declared carried.

It was accordingly decided to recommend that no appointment be made.

Proposed Importation of Tamworth Pigs from Canada.

A letter was submitted from the Ministry of Agriculture and Fisheries with respect to a proposed importation of five boars, four in-pig gilts, and one empty gilt of the Tamworth breed from Canada. The importation would be under the provisions of the Importation of Pedigree Animals Act, 1925. The pigs were registered in the Canadian National Record for Swine. The Ministry asked if the Society agreed that the Canadian National Record for Swine should be recognised for the purposes of Section 1 of the above Act.

It was decided to inform the Ministry that the Directors agreed to the recognition of the Canadian National Record for Swine.

Animal Diseases Research Association.

An application was submitted from the Animal Diseases Research Association for renewal of the grant of £200 for the current year.

On the recommendation of the Finance Committee it was agreed that the grant be renewed.

Glasgow Veterinary College.

An application from the Glasgow Veterinary College was submitted, asking for a renewal of the grant of £150 for the current year.

On the recommendation of the Finance Committee, it was agreed that the grant be renewed.

Grants to Local Societies.

The Secretary stated that, at the Meeting of Directors in January, it was decided to resume the scheme of Grants to Local Societies in aid of Show Premiums, which had been suspended during the war. Intimation of this had been now made to the Societies concerned.

Seven new applications had since been received for the £12 Grant for Show Premiums, and it was decided that all of these be granted; one application for a £10 Grant to a Federation of S.W.R.I. was also granted.

Publications.

A Minute of Meeting of Publications Committee, dated 3rd April, was submitted and approved.

The Minute stated that a letter was submitted from Mr D. Witney, B.Com., Advisory Officer in Economics at the Edinburgh and East of Scotland College of Agriculture, suggesting that the Society consider the desirability of initiating a Survey of Scottish Agriculture somewhat on the lines of the Statistical Accounts which were prepared in the end of the eighteenth century and in the middle of the nineteenth century. There was also submitted a letter from the Scottish Council of Social Service, forwarding a report by a Committee appointed by that body on a proposed Third Statistical Account of Scotland.

After discussion, it was decided, in the absence of the Convener of the Publications Committee, to delay further consideration, but, in the meantime, to ascertain what the attitude of the Department of Agriculture for Scotland was with regard to undertaking such a Survey.

Glasgow Agricultural Exhibition.

A Minute of Meeting of Special Committee, dated 2nd April, was submitted.

The Minute stated that the Convener, Mr James R. Lumsden, had reported briefly on the proceedings at the Meeting convened by the Lord Provost of Glasgow on 11th March, when it was decided to proceed with the proposed Exhibition and an Executive Committee was appointed. He also reported on the proceedings at a subsequent meeting of the Executive Committee, when it was decided to raise a Guarantee Fund, the suggested amount of which was £10,000.

The Committee decided to recommend that the Society, if and when invited, should guarantee an amount of £1000, this, however, to be subject to a full Guarantee Fund of £12,500 being subscribed.

The Minute and proposed Guarantee of £1000 were approved, on the understanding that the Special Committee should be satisfied that the arrangements for the Exhibition and Guarantee Fund were satisfactory.

Finance.

A Minute of Meeting of Finance Committee, dated 3rd April, was submitted and approved.

The Minute dealt with the following matters :—

Scottish Association of Young Farmers' Clubs.—In January Mr James Paton, the Society's representative to the Scottish Association of Young Farmers' Clubs, forwarded a letter he had received from the Secretary of the Association, suggesting that the Society might be willing to offer a Challenge Cup for the best Speech-making Team at the Annual Debating and Speech-making Competitions. The letter explained that, in 1946, the Association were holding a National Contest, at which the winning teams from each of the four Areas—East, West, North-East, and Highland—were to compete. The date of the Contest was 16th March.

As no meeting of the Finance Committee, or of the Board of Directors, would take place before that date, it was decided to obtain the views of the Committee by post. The result was a unanimous expression of opinion in favour of the giving of such a Cup. A Silver Challenge Cup was accordingly purchased from the Society's Cupmakers—Messrs Hamilton & Inches—at a cost of £40, and was forwarded to the Association, by whom it was duly awarded at the Contest on 16th March.

The Committee expressed the hope that the Board of Directors would homologate the action which they had taken.

Scottish Red Cross Agriculture Fund.—The Committee recommended that the expenses incurred in connection with the activities of the Scottish Red Cross Agriculture Fund Committee, during its sixth year, amounting to a sum of £82, 10s. 9d., be defrayed by the Society.

Edinburgh Highland Reel and Strathspey Society.—It was recommended that a grant of £75 be given for the current year.

Glasgow and West of Scotland S.P.C.A.—It was recommended that a grant of £10 be again given to the Glasgow and West of Scotland Society for the Prevention of Cruelty to Animals for the current year.

Staff Salaries.—The Sub-Committee appointed at last Meeting to consider the salaries of members of the Society's staff, in view of the prevailing economic conditions, had submitted a report. The Finance Committee had approved the report of the Sub-Committee, and, in accordance therewith, recommended the following increases in salaries, these to take effect as from 1st April :—

Mr John Stirton, Secretary, from £1500 to £1750.

Mr Thomas W. Russell, Chief Clerk and Cashier, from £400 to £525.

Mr John Watt, Second Clerk, from £400 to £450.

Mr Harry F. Currie, Third Clerk, from £300 to £375.

Miss A. T. Maitland, Typist, from £226 to £275.

Miss C. S. Stirton, Typist, from £176 to £225.

Mr J. P. Lauder, Officer and Caretaker, from £180 to £200, plus cleaning allowance, £52.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 6TH JUNE 1945.

Mr J. E. KERR of Harviestoun, Dollar, in the Chair.

The President.

The Secretary read a letter of apology for absence from the President, Lochiel, who expressed the hope that arrangements would be successfully completed for holding the Show at Inverness in 1946.

New Members.

The Secretary submitted a list of 54 candidates for election to membership. These were balloted for and duly elected.

Election of Office-bearers.

Mr James R. Lumsden of Arden, Chairman of Directors, moved that the following be elected Office-bearers of the Society for the year 1945-46:—

President.—Sir Donald W. Cameron of Lochiel, K.T., Achnacarry, Spean Bridge, Inverness-shire.

Vice-Presidents.—The Duke of Sutherland, K.T., P.C., Dunrobin Castle, Golspie; The Earl of Leven and Melville, K.T., Glenferness House, Nairn; The Lord Lovat, D.S.O., M.C., Beaufort Castle, Beaulieu; Major John Stirling of Fairburn, Muir-of-Ord, Ross-shire.

Ordinary Directors, 1942.—Mr J. W. Alexander, M.V.O., Inglewood, Moffat; Mr W. J. Campbell, 61 Fountainhall Road, Edinburgh; Mr Francis W. Walker of Leys, Leys Castle, Inverness; Mr William H. Lawson, Frithfield, Anstruther; Mr William Brown, Craigton, Bishopton, Renfrewshire; Mr John N. Reid, Cromley Bank, Ellon; Sir Joshua Ross-Taylor, Mungoswalls, Duns; Mr J. E. Kerr of Harviestoun, Dollar.

1943.—Mr William D. Simpson, Highfield, North Berwick; Mr Ian M. Campbell, Bal Blair, Invershin, Sutherland; The Earl of Elgin and Kincardine, K.T., C.M.G., Broomhall, Dunfermline; Mr A. W. Montgomerie, O.B.E., Westburn Farm, Cambuslang; Mr Alexander Forbes, Rettie, Banff; Mr R. Scott Aiton, M.C., Legerwood, Earlstoun; Captain James Craig, Gwydyr House, Comrie Road, Crieff; Mr James Wither, Awhirk, Stranraer.

1944.—Captain Ian S. Robertson, Linkwood, Elgin; Mr John Niven, Gloagburn, Tibbermore; Mr James Clark, Windlaw Farm, Carmunnock; Mr James Durno, Crichtie, Inverurie; Mr Matthew Templeton, Goshen Bank, Kelso; Mr James Johnston, Dunmore Home Farm, Falkirk; Mr William Montgomery, Banks, Kirkcudbright; Mr William Allison, Almond Hill, Kirkliston.

1945.—Mr Thomas A. Wedderspoon, Castleton, Eassie, Angus; Mr James Kilpatrick, Craigie Mains, Kilmarnock; Mr George Grant of Glenfarclas, Blacksboat; Captain R. J. Thomson, Kaimes, West Linton; Mr James M'Laren, Alton, Stirling; Mr Peter W. Crawford, Dryfeholm, Lockerbie; Mr Ian C. Menzies, O.B.E., Broomhills, Liberton, Edinburgh; Mr Ralph S. MacWilliam, Garguston, Muir-of-Ord, Ross-shire.

Extraordinary Directors.—Major R. F. Brebner, C.B.E., The Leuchold, Dalmeny House, Edinburgh; Mr Alexander Cormack, Dunkyan, Killearn, by Glasgow; Mr William I. Elliot, Middleton, Stow, Midlothian; Mr John Kerr, Yorkston, Gorebridge, Midlothian; Mr James R. Lumsden of Arden, Dumbartonshire; Mr Andrew R. Page, Argyll Estates Office, Inveraray; Mr James Paton, Kirkness, Glencraig; Mr Richard J. Singer, F.I.A. (Scott.), (Walleys' Marts, Ltd.), Castle-Douglas, Kirkcudbrightshire; Mr John P. Sleight of St John's Wells, Fyvie; Mr James Wyllie, Beaumont, Victoria Road, Dumfries.

Show Division Directors.—The Provost of Inverness; Mr D. M. Allan, Ballintomb, Grantown-on-Spey; Mr Alexander Calder, Shamrock Lea, Kirkwall; Mr James Cameron, Balnakeyle, Munloch; Major A. D. Campbell, Stanstill, Wick; Mr George J. Grant, Pulrossie, Dornoch, Sutherland; Mr Kenneth P. MacGillivray, Kirkton, Bunchrew,

Inverness ; Captain R. Maclean of Drynie, North Kessock, by Inverness ; Mr William Petrie, Wester Manbein, Elgin ; Mr Andrew Wilson, Broombank, Auldearn, Nairn.

Treasurer.—The Earl of Home, K.T., The Hirsell, Coldstream.

Honorary Secretary.—Mr Alexander Murdoch, East Hallside, Cambuslang.

Captain Ian S. Robertson, Linkwood, Elgin, seconded the motion, and the Office-bearers were duly elected.

Special Grants.

Mr Alexander Murdoch, East Hallside, Cambuslang, Honorary Secretary, moved approval of the following Special Grants, which were recommended by the Board of Directors :—

- (1) £200 for the current year, to the Animal Diseases Research Association.
- (2) £150 for the current year, to the Glasgow Veterinary College.
- (3) £50 for the current year, to the Edinburgh Highland Reel and Strathspey Society, plus £25 extra war contribution.
- (4) £10 to the Glasgow and West of Scotland Society for the Prevention of Cruelty to Animals.

Mr James Paton, Kirkness, Glencraig, seconded the motion, and the Special Grants were duly approved.

Show of 1946.

The Chairman of Directors, Mr James R. Lumsden, reported that at the Directors' meeting, held earlier that day, a small Committee had been appointed to keep in touch with the various authorities with whom they needed to negotiate in regard to the possibility of holding a Show at Inverness in 1946. There were various difficulties which had to be overcome, such as a shortage of timber and canvas for building the Showyard, a shortage of man-power for erecting the yard, catering difficulties, and the present state of the Showground, part of which had been under cultivation during the last few years. They very much hoped, however, that these difficulties would all be overcome, and the small Committee which had been appointed would keep in touch with the situation and report to the meeting of the Directors in November. If it were possible to have the Show the dates would be from Tuesday, 18th June, to Friday, 21st June. These were in accordance with the arrangement made with the Royal Agricultural Society of England as to the dates of the "Highland" and "Royal" Shows.

Agricultural Education.

Sir Joshua Ross-Taylor, Mungoswalls, Duns, Chairman of the National Agricultural Examination Board, submitted the following Report on the Forty-eighth Examination for the National Diploma in Agriculture :—

It was again arranged to hold two Examinations in 1945—one at Edinburgh during April for Scottish and other students, and the other at Leeds in July for English and Welsh students.

At the Examination at Edinburgh, which was held from 4th to 11th April, 132 candidates presented themselves. The majority of the candidates were from Scottish centres, along with others from Leeds University, the Harper Adams Agricultural College, and other English centres. As a result of the Examination, 34 Diplomas were awarded.

Of the 132 candidates, 6 appeared for all subjects, and 4 of these obtained the Diploma. Forty-nine had passed certain subjects previously, and were completing the Examination on this occasion, and, of these, 30 were successful in obtaining the Diploma. The names of the successful candidates appear in the Appendix to this volume.

The remaining 77 presented themselves for first groups of three, four, or five subjects, and, of these, 50 passed in the subjects for which they appeared, and were entitled to appear for the second group of subjects at a subsequent Examination.

Thirty-four candidates failed in either one, two, or three subjects, which, under the Regulations, they will be allowed to take again at a following Examination.

At the Examination to be held at Leeds in July, 219 candidates had applied for admission. That number, along with the 132 candidates who appeared at Edinburgh, made a total of 351 candidates for the year 1945. In 1944 the number entering was 304, which was then a record entry for this Examination.

Sir Joshua added that in view of the record number of entrants, it was somewhat difficult to understand the mind of those who would have the Examination transferred to some other authorities than the Royal and Highland Societies. It was evident that the candidates who passed realised and appreciated the benefit that attached to the initials "N.D.A." after their names.

Scottish Red Cross Agriculture Fund.

Major R. F. Brebner, C.B.E., a Vice-Chairman of the Fund, said that, as the General Committee of the Fund had not yet met, he was unable to submit a report on the final result of the fifth year's activities before consideration by that Committee. He could say, however, that the fifth year of the Fund was the most successful year of all. A large sum of money had been raised during the five years that the Fund had been in operation. The Duke of Gloucester's Fund was to be closed at the end of June; and the Society's Finance Committee had recommended that the Scottish Fund should also close at the same time, although it would continue to remain open for a limited time in order to receive the proceeds of this year's Victory Garden Shows, &c. They would have been willing to go on if necessary, but evidently the Red Cross funds were sufficient for present needs. In any case, if the Highland Show was to be held at Inverness in 1946 it would be impossible for Mr Stirton and his staff to carry on with the Red Cross Fund. They need not have any regrets in closing down. A very handsome contribution had been made to the Red Cross, and Agriculturists could be proud of what they had done.

Mr J. Milne Henderson, Edinburgh, remarked that Mr Stirton and all those associated with him in this great effort deserved credit for what they had done throughout the war. He then commended the claims of the Scottish Veterans' Garden City Association to the sympathetic consideration of the Society, saying it was a worthy object which farmers might feel inclined to help by means of free gift sales.

General.

Mr James R. Lumsden, Chairman of Directors, reported briefly on other matters which had engaged the attention of the Directors during the past six months.

Protest against Summer Time.—At their meeting on 10th January, the Directors decided to protest against the continuance of Double Summer Time in summer and Single Summer Time in winter. In accordance with that decision a Memorandum setting forth the views of the Society had been prepared and copies sent to all Scottish Members of Parliament, to Scottish Representative Peers, and to Government Departments.

In a statement made to the House of Commons by the Home Secretary on 1st March, it had been intimated that Double Summer Time would start on 2nd April and last until 15th July, and that it might be possible, in accordance with pre-war practice, to revert to Greenwich Mean Time on 7th October.

Proposed Agricultural Machinery Experimental Station.—Representatives of the Society had attended a meeting with officials of the Department of Agriculture on 17th January, when the question of setting up an Agricultural Machinery Experimental Station in Scotland was discussed. The Department were anxious to see a Station set up in Scotland, but it appeared it must be a Sub-Station to the main Station in England. To have a Station for Scotland alone would mean a duplication of staff, which seemed unnecessary. A Committee had been appointed and the matter was still under consideration.

Modernisation of Existing Houses.—The Special Committee appointed on 10th January prepared a Memorandum of Evidence on the Modernisation of Existing Houses in rural areas, and that Memorandum had been forwarded to the Secretary of the Scottish Housing Advisory Committee. The Society's representatives had not been asked to give oral evidence in support of the Memorandum.

Committee on Agricultural Education in Scotland.—At the request of the Committee the Society's representatives again appeared before the Committee on 12th April, when they submitted the views of the Society on certain new proposals which had been put forward by two members of the Committee.

Colouring Matter in Sheep Dips.—A representative of the Society attended a meeting called by the National Farmers' Union and Chamber of Agriculture on 11th April to discuss the question of legislation to control the manufacture and use of sheep dips containing colouring matter which had a detrimental effect on wool.

Science.

In the absence, through indisposition, of Dr J. F. Tocher, Consulting Chemist to the Society, Mr J. W. Alexander, M.V.O., Convener of the Science Committee, submitted a report on the work done in the Chemical Department during the first five months of 1945. The substance of the report appears on pp. 146-149 of this volume.

Vote of Thanks.

A cordial vote of thanks to Mr J. E. Kerr for presiding was moved by Mr James Durno, Crichton. He remarked that Mr Kerr had probably a longer continuous record of service as a Director than any member of the Board, and that during that long period his interest in the Society had never wavered.

ANNIVERSARY GENERAL MEETING, 9TH JANUARY 1946.

The EARL OF HOME, K.T., Treasurer of the Society, in the Chair:

The President.

The Secretary read a letter of apology for absence from the President, Lochiel.

Election of Members.

The Secretary submitted a list of 39 candidates for election to membership. These were balloted for and duly elected.

Membership.

Mr James R. Lumsden of Arden, Dumbartonshire, Chairman of Directors, reported that the membership of the Society at the beginning of 1945 was 8118. During the year there had been lost, through death, resignations, and other causes, 221 members. New members elected during the year numbered 104 (50 in January and 54 in June), thus making the total membership at that date 8001.

Of that number 5950 were Life Members and 2051 paid subscriptions annually—224 on the higher rate and 1827 on the lower. 91 members of the Society, so far as was known, were still on service with H.M. Forces, and these, in accordance with the resolution of the Directors, would continue to receive the privileges of membership without payment of subscriptions.

Election of Director.

Mr James R. Lumsden moved that, in accordance with the unanimous recommendation of the Board of Directors, Mr J. Milne Henderson, 15 Merchiston Park, Edinburgh, be elected an Extraordinary Director of the Society, to fill the vacancy caused by the death of Mr John P. Sleight.

The motion was unanimously agreed to.

Mr Henderson, in thanking the Meeting, said he did not know if it was a wise thing for a man who had passed ninety-one years of age to take on extra work, but he would do his best to support the Society as he had always done in the past.

Finance.

The Earl of Home, K.T., Treasurer of the Society, submitted the Accounts of the Society for the year ended 30th November 1945.

The Society's Capital Funds, he said, showed a decrease as compared with the previous year, due to market depreciations in Railway and Bank Stocks.

Revenue for the year from all sources amounted to £8719, 12s. 8d., of which £1112, 13s. had been derived from annual subscriptions and £1239 from life subscriptions.

Expenditure amounted to £7400, 1s. 1d. During the year under review the net expenditure on Educational Work amounted to £159, 1s. 4d.; on work in the Chemical and Veterinary Departments, £323, 0s. 8d.; on the Society's 'Transactions,' £1117, 2s. 11d.; and in grants to Local Societies in 1944, £374, 15s. 2d.

Special grants had been made during the year as follows: Animal Diseases Research Association, £200; Glasgow Veterinary College, £150; Royal Scottish Agricultural Benevolent Institution, £100; Scottish Agricultural Organisation Society, Ltd., £100; Scottish Red Cross Agriculture Fund, £184, 19s. 2d.; other grants, £97, 2s.—a total of £832, 1s. 2d.

Lord Home then moved approval of the following special grants, which had been recommended by the Board of Directors:—

- (1) £100 to the Scottish Agricultural Organisation Society, Ltd., for the year 1946.
- (2) £100 to the Royal Scottish Agricultural Benevolent Institution for the year 1946.
- (3) £10 to the Scottish Society for the Prevention of Cruelty to Animals.

Capt. Ian S. Robertson, Linkwood, Elgin, seconded, and the Accounts were adopted and the special grants unanimously approved.

Argyll Naval Fund.

Mr James R. Lumsden of Arden, Convener of the Committee of the Argyll Naval Fund, submitted the report on the Fund for the year ended 30th November 1945. The income from the Fund for the year amounted to £352, 16s. 5d., while the expenditure comprised grants of £60 each to four Naval Cadets—a total of £240.

Several vacancies, he said, were still waiting to be filled, and if any member knew of any suitable candidate, full particulars could be obtained from the Secretary. The annual allowance to beneficiaries under the Fund had been increased recently from £40 to £60.

First Post-war Show at Inverness.

Mr Francis W. Walker of Leys, Leys Castle, Inverness, submitted the following report on the first post-war Show at Inverness.

On 6th June 1945 the Directors had appointed a Special Committee to watch developments with respect to the possibility of holding a Show at Inverness in 1946, to keep in touch with the various authorities, to inspect the Showground, and to report to the Meeting of the Board in November.

In October information had been received from the Royal Agricultural Society of England that a deputation from that body had waited upon the Minister of Agriculture (Mr Tom Williams) on 24th August, with a view to obtaining the approval and support of the Minister to proposed applications to the various Ministries for priority licences for labour, material, transport, &c., for a Royal Show in 1946. The Minister, in reply, had expressed regret that he was unable to agree to their request. He based this refusal on the increasing demand for labour in connection with the building of houses, on transport difficulties due to demobilisation and the change-over from munitions to civilian industries, and the difficulties of catering for large numbers of people and the feeding of animals. From a communication received from the Secretary of the Department of Agriculture for Scotland it was evident that the attitude of the Department was in line with that of the Ministry of Agriculture.

On 7th November the Special Committee had reported that they were unanimously of opinion that it would be quite impossible to hold a Show at Inverness in 1946. They had recommended that, in the meantime, every step should be taken to secure facilities for a Show there in 1947.

Scottish Red Cross Agriculture Fund.

Major R. F. Brebner, C.B.E., The Leuchold, Dalmeny House, reported that at the General Meeting, held on 6th June 1945, it had not been possible to submit the latest details of the Fund for the Fifth Financial Year ending on 16th April 1945, as the Annual Meeting of the Scottish Red Cross Agriculture Fund had not been held by that time. That Meeting had been held on 20th July 1945, when it had been reported that the total raised during the fifth financial year amounted to £213,420, 19s. 7d. That total exceeded the previous highest total, raised in the preceding year, by about £42,000. The aggregate total for the five years amounted to £762,525, 0s. 6d. It was unnecessary, he said, to go into further details, as the Annual Report, giving full details, appeared in the 1945 'Transactions.'

Towards the end of June 1945 intimation had been received that the Duke of Gloucester's Fund was to be closed as at 30th June 1945. In view, however, of the short notice of closure given, and in conformity with the decision of the Red Cross Agriculture Fund in England, it had been decided, although the general Appeal for funds was to be terminated, to keep open the Scottish Fund in the meantime for the purpose of ingathering various balances in the hands of the Area Committees, the proceeds of Victory Garden Shows which had been arranged, and the recovery of Income Tax receivable under Deeds of Covenant. Once all these were collected and received, the Fund would be closed finally.

The results for the sixth and current financial year could not, of course, be compared with those of the five preceding years, when all activities were in full swing. Nevertheless, sums totalling over £12,000 had been received. The revenue then being received might be described as balances or remainders from previous efforts, or derived from various enterprises which had been arranged before the notice of closure was intimated, and which were proceeded with according to the original plans. Details of these contributions would be published in due course when the Fund was finally closed.

Now that the Fund was in course of closing down, it was well to record that the extent of the Fund had surpassed all original expectations and hopes. The response by all sections of the agricultural community had been ready and whole-hearted. This had been reflected in the constant and ever-increasing contributions from the various County and District Committees throughout Scotland.

On the motion of Mr Alexander Murdoch, Honorary Secretary of the Society, it was agreed that the Society should place on record an expression of its appreciation of the great amount of work which Major Brebner had done in connection with the raising of such a huge sum for the Red Cross Agriculture Fund.

Gift of Victory Lamp.

Mr James R. Lumsden reported that when in London in October last he had received, on behalf of the Society, the gift of a Victory Lamp from the Chairman's Committee of

the Red Cross Agriculture Fund in England. The lamp, which was on view, bore the following inscription: "Victory Lamp, Replica of Florence Nightingale's Lamp, presented by the Chairman's Committee of the Red Cross Agriculture Fund to the Highland and Agricultural Society of Scotland, in recognition of most generous help."

The Directors had decided that the lamp should be hung in a prominent position in the Society's Chambers.

Grants to Local Societies:

Mr James Paton, Kirkness, Glencraig, reported that the grants made by the Society in 1945 had been in the main restricted to Horse-breeding Associations, and a sum of £180 had been expended during the year in respect of such grants. In addition, special grants for Allotments and other competitions amounted to £41, 6s. 3d., and the cost of Ploughing, Hoeing, and Long Service Awards was £203, 5s. 11d.—making a total expenditure of £424, 12s. 2d. for the year 1945.

The issue of Gold Medals for Long Service Awards had been temporarily suspended during the war, and might continue to be suspended for some time, but applicants were entitled, in the meantime, to the appropriate Certificates, and would be eligible to receive the Gold Medals when these become available.

For the year 1946 the Directors had continued the following grants: seven Horse-breeding Associations for grants of £15 each in respect of Stallions engaged; £15 and fifteen Silver Medals to the Scottish National Union of Allotment Holders for Allotments Competitions; two Silver Medals to the Scottish Gardens and Allotments Committee for National Allotments Competitions; various other special grants; and the usual awards for Long Service, Ploughing, and Hoeing Competitions. Earlier that day the Directors had authorised grants of £15 each to six Horse-breeding Associations, in addition to various other grants. The total of all these awards and grants was estimated at £592.

In January 1941 the Directors had decided that it was undesirable for the Society to encourage the holding of Agricultural Shows during the war, and it had been decided, accordingly, that all grants by the Society of money and medals in aid of Local Agricultural Shows be suspended throughout the further duration of the war. Various Societies and Associations were then in receipt of grants which, in the ordinary course, would have been made to them in 1941. The Directors had that day decided to resume these grants, and the Societies and Associations concerned would, therefore, be entitled to their respective awards for the year 1946. The cost of these further grants, if fully taken up by the Societies and Associations, would be £352, 10s.

The estimated total expenditure for all classes of grants in 1946 was accordingly £944, 10s.

Education.

National Diploma in Agriculture.—Mr James Durno, Crichtie, Inverurie, submitted the following report on the Forty-ninth Examination for the National Diploma in Agriculture, held in July 1945:—

The arrangement whereby two Examinations were held—one at Edinburgh in April and one at Leeds in July—had been again followed. This arrangement had been first adopted in 1940, as an exceptional measure, to meet the special circumstances of the Agricultural Colleges in England and Wales, due to the war.

A full report on the Examination held at Edinburgh had been given at Meetings held on 6th June last.

At the Examination held at Leeds from 11th to 20th July, 218 candidates had appeared. As a result of the Examination 72 Diplomas were awarded. One Honours award had been made—the candidate being a student of the Harper Adams Agricultural College. Of the 218 candidates, 8 had appeared for all subjects, and, of these, 4 obtained the Diploma. 105 had passed certain subjects previously, and were completing the Examination on that occasion, and, of these, 68 were successful in obtaining the Diploma. The names of the successful candidates appear in the Appendix to this volume.

The remaining 105 presented themselves for first groups of three, four, or five subjects, and, of these, 56 passed in the subjects for which they had appeared, and were entitled to appear for the second group of subjects at a subsequent Examination.

The number of candidates forward for the Examination in 1945—132 at Edinburgh and 218 at Leeds, in all 350—surpassed the record entry of 298 in 1944.

With reference to the Examinations to be held in 1946, it might be added that, as a special measure, two Examinations would again be held—the first at Edinburgh in April and the second at Leeds in July.

National Diploma in Dairying.—Mr James Durno also submitted a report on the Examination for the National Diploma in Dairying, held in September 1945.

The Fiftieth Annual Examination for the National Diploma in Dairying took place during September at the Dairy School for Scotland, Auchincruive, Ayr, for Scottish

students, and at the University and British Dairy Institute, Reading, for English and Welsh students.

At the Auchincruive Centre, 60 candidates presented themselves—52 candidates appeared for all subjects, 2 for Part II. subjects, and 5 candidates for re-examination in certain subjects in which they had previously failed. 23 candidates obtained the Diploma. In addition, 1 candidate appeared for Part I. of the Examination.

At the Reading Centre, 99 candidates presented themselves—77 taking the whole Examination, and 22 for re-examination in certain subjects in which they failed previously. 54 candidates obtained the Diploma at that Centre.

The names of the successful candidates appear in the Appendix to this volume.

Of those candidates who failed, 20 at Auchincruive and 24 at Reading failed in not more than three subjects, and these would be permitted, after further study, to reappear at the next Examination for the subjects in which they failed.

General.

Mr James R. Lumsden, Chairman of Directors, reported that since the Half-yearly Meeting held on 6th June 1945, other matters which had engaged the attention of the Board of Directors were:—

Colouring Matter in Sheep Dips.—On 6th June the Directors had agreed to approve the terms of the following resolution which had been submitted by the National Farmers' Union and Chamber of Agriculture to a joint meeting of representatives of interested bodies, at which the Society had been represented: "That legislation be required to prohibit the manufacture or use of sheep dips containing colouring matter which will not scour out of the wool in the normal trade process of scouring."

Inspection of Growing Crops of Potatoes.—On 11th October representatives of the Society had attended a Meeting, convened by the Department of Agriculture for Scotland, in connection with the scheme for the inspection of Growing Crops of Potatoes. In submitting a report on the proceedings at the Meeting the Society's representatives had expressed the view that the standard for stock seed should be raised. It had been decided that a letter be sent to the Department of Agriculture to the effect that the Directors were of opinion that certificates for stock seed should not be granted where the crop had been rogued to an extent exceeding 2·5 per cent before the first inspection took place. It was hoped that this limit might be further reduced as a result of experience in later years.

Houses for Rural Workers.—On 7th November it was decided that a letter be addressed to the Secretary of State for Scotland with regard to the discontinuance of the Housing (Rural Workers) Act, 1926. In discussion it was pointed out that the Minister of Health had stated in the House of Commons that he hoped to give the country a better Act. The Directors were of opinion that the Government should be pressed to disclose its new proposals, because, in the meantime, housing in rural areas was entirely held up.

Mr Francis W. Walker of Leys, Leys Castle, Inverness, said he thought it was time the Society had a reply to its representations sent to the Secretary of State on 7th November. It was agreed to press for a reply.

Hill Sheep Subsidy.—Continuing, Mr Lumsden said that representatives of the Society attended a Meeting, called by the N.F.U. and Chamber of Agriculture, on 19th December, when consideration was given to the continuance of the Hill Sheep subsidy payment and the rate to be suggested. On 20th December a delegation from the joint meeting met officials of the Department of Agriculture, when figures were submitted and compared.

Proposed Labelling Bill for Wool Textiles.—Representatives of the Society had also attended a Meeting of the National Association of Scottish Woollen Manufacturers, when a discussion took place with regard to a proposal that a Wool Textiles Labelling Act for the United Kingdom be applied for.

Scottish Primary Products Competition.—The Directors had agreed that the Society contribute a sum not exceeding £100 towards the expenses of the Competition in 1945.

Science.

Mr J. W. Alexander, M.V.O., Convener of the Science Committee, submitted a report on the work done in the Chemical Department during 1945. The substance of the report appears on pp. 146-149 of this volume.

Vote of Thanks.

On the motion of Mr A. W. Montgomerie, O.B.E., Westburn Farm, Cambuslang, a cordial vote of thanks was accorded to The Earl of Home, K.T., for presiding,

APPENDIX

PREMIUM BOOK

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

1946

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JOHN STIRTON, O.B.E., Secretary,
The Highland and Agricultural Society of Scotland,
8 Eglinton Crescent,
Edinburgh 12.

Telephone: 23655.

Telegraphic Address: "Society, Edinburgh."

GENERAL NOTICE.

THE HIGHLAND SOCIETY was instituted in the year 1784, and incorporated by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have since been continuously directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The Society avoids questions of political controversy, but in other public matters of practical concern to agriculture it seeks to guard and promote, by every means in its power, the welfare of all interested in the agriculture of Scotland.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of Great Britain, Northern Ireland, and Eire (Irish Free State) are allowed to compete.

2. A system of District Shows instituted for the purpose of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Societies and Associations.

3. A scheme of Awards to Farm Workers for long and approved service in Scotland.

4. The encouragement of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising the Society to grant Diplomas to Students of Agriculture; and by giving grants in aid of education in Agriculture and allied sciences. In 1900 the Society discontinued its own Examination, and instituted jointly with the Royal Agricultural Society of England an Examination for a National Diploma in Agriculture.

5. The institution of an Examination for a National Diploma in Dairying, jointly with the Royal Agricultural Society of England and the British Dairy Farmers' Association.

6. The institution of an Examination in Forestry for First and Second Class Certificates. Terminated in 1935 in accordance with arrangements made with the Royal Scottish Forestry Society.

7. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise. Terminated in 1881 in accordance with arrangements made with the Royal College of Veterinary Surgeons.

8. The establishment of a Botanical Department.

9. The appointment of an Entomologist to advise members regarding insect pests, &c.

10. The annual publication of the 'Transactions,' comprehending papers by selected writers, Prize Reports, and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications.

11. The management of a fund left by John, 5th Duke of Argyll (the original President of the Society), to assist young natives of the Highlands who enter His Majesty's Navy.

CONSTITUTION AND MANAGEMENT.

The general business of THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND is conducted under the sanction and control of the Royal Charters, referred to above, which authorise the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty-two Ordinary and Twenty Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers.

The Supplementary Charter of 1856 provides for the appointment of a Council on Education, consisting of Sixteen Members—Nine nominated by the Charter and Seven elected by the Society.

STATEMENT OF PRIVILEGES OF MEMBERS.

MEMBERS OF THE SOCIETY ARE ENTITLED—

1. *To receive a free copy of the 'Transactions' annually.*
2. *To apply for District Premiums that may be offered, and for Long Service Awards for Agricultural Employeess.*
3. *To report Ploughing Matches for Medals that may be offered.*
4. *To Free Admission to the Shows of the Society.*
5. *To exhibit Live Stock and Implements at reduced rates.*

Firms are not admitted as Members; but if one partner of a firm becomes a Member the firm is allowed to exhibit at Members' rates.

6. *To obtain Reports on the Animal Enemies of Crop Plants and Live Stock (including Poultry).*
7. *To attend and vote at General Meetings of the Society.*
8. *To vote for the Election of Directors.*
&c., &c.

REPORTS ON THE ANIMAL ENEMIES OF CROP PLANTS AND LIVE STOCK (INCLUDING POULTRY).

The Consulting Zoologist is prepared to send to any Member of the Society a Report on damage to, or diseases of, plants and animals due to animal agency (Insects, Mites, Worms, Snails, Slugs, Birds, and the Smaller Mammals).

For further particulars, see under Entomological Department.

Consulting Zoologist.—Mr A. E. CAMERON, M.A., D.Sc., Department of Agricultural and Forest Zoology, University of Edinburgh, 10 George Square, Edinburgh.

TERMS OF MEMBERSHIP, &c.

The influence and usefulness of the Society depend mainly upon its strength in membership. The Members, through the Directors whom they elect, have the practical control of the affairs of the Society. The stronger the body of Members, the greater will be the usefulness of the Society. It will therefore be to both their own and the public advantage if all who are interested in agriculture, and who are not already enrolled, should at once become Members of the Society.

ELECTION OF MEMBERS.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June. It is not necessary that the proposer should attend the Meeting.

RATES OF SUBSCRIPTION.

HIGHER SUBSCRIPTION.

The ordinary annual subscription is £1, 3s. 6d., and the ordinary subscription for life-membership is £12, 12s.; or after ten annual payments have been made, £7, 7s.

LOWER SUBSCRIPTION.

Proprietors farming the whole of their own lands, whose rental on the Valuation Roll does not exceed £500 per annum, and all Tenant-Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors resident on Estates, Land Stewards, Foresters, Agricultural Implement Makers, Grain, Seed and Manure Merchants, Agricultural Auctioneers, Cattle Dealers and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, and such other persons as, in respect of their official or other connection with agriculture, the Board of Directors may consider eligible, are admitted on a subscription of 10s. annually, which may be redeemed by one payment of £7, 7s., and after eight annual payments of 10s. have been made, a Life Subscription may be purchased for £5, 5s., and after twelve such payments, for £3, 3s.

It must be stated, on behalf of Candidates claiming to be admitted at the Lower Rate of Subscription (10s.), under which of the above designations they are entitled to be admitted at the Lower Rate.

Subscriptions are payable on election, and afterwards annually in January.

According to the Charter, a Member who shall not have objected to his election, on the same being intimated to him by the Secretary, cannot retire until he has paid, in annual subscriptions or otherwise, an amount equivalent to a life composition.

Members are requested to send to the Secretary the names and addresses of Candidates proposed for admission to the Society, at the same time stating whether the Candidates should be admitted at the £1, 3s. 6d. or 10s. rate.

Patron of the Society.—HIS MAJESTY THE KING.

OFFICERS AND DIRECTORS FOR 1945-1946.

President.

Sir DONALD W. CAMERON OF LOCHIEL, K.T., Achnacarry, Spean Bridge, Inverness-shire.

Vice-Presidents.

The DUKE OF SUTHERLAND, K.T., P.C., Dunrobin Castle, Golspie.
The EARL OF LEVEN AND MELVILLE, K.T., Glenferness House, Nairn.
LORD LOVAT, D.S.O., M.C., Beaufort Castle, Beauly.
Major JOHN STIRLING of Fairburn, Muir-of-Ord, Ross-shire.

Year of
Election.

Ordinary Directors.

	J. W. ALEXANDER, M.V.O., Langshaw, Moffat (<i>elected 5th January 1944</i>).
1942	W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
	FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
	WILLIAM H. LAWSON, Frithfield, Anstruther.
	WILLIAM BROWN, Craigton, Bishopston, Renfrewshire
	JOHN N. REID, Cromley Bank, Ellon.
	Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
	J. E. KERR of Harviestoun, Dollar.
1943	WILLIAM D. SIMPSON, Highfield, North Berwick.
	IAN M. CAMPBELL, Bal Blair, Invershin, Sutherland.
	The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
	A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.
	ALEXANDER FORBES, Rennie, Banff.
	R. SCOTT AITON, M.C., Legerwood, Earlston.
	Captain JAMES CRAIG, Gwydyr House, Comrie Road, Crieff.
	JAMES WITHER, Awhirk, Stranraer.
1944	Captain IAN S. ROBERTSON, Linkwood, Elgin.
	JOHN NIVEN, Gloagburn, Tibbermore.
	JAMES CLARK, Windlaw Farm, Carmunnock.
	JAMES DURNO, Crichtie, Inverurie.
	MATTHEW TEMPLETON, Goshen Bank, Kelso.
	JAMES JOHNSTON, Dunmore Home Farm, Falkirk.
	WILLIAM MONTGOMERY, Banks, Kirkcudbright.
	WILLIAM ALLISON, Almond Hill, Kirkliston.
1945	THOMAS A. WEDDERSPOON, Castleton, Fessie, Angus.
	JAMES KILPATRICK, Craigie Mains, Kilmarnock.
	GEORGE GRANT of Glenfarclas, Blacksboat.
	Captain R. J. THOMSON, Kaimies, West Linton.
	JAMES M'LAREN, Alton, Stirling.
	PETER W. CRAWFORD, Dryfeholm, Lockerbie.
	IAN C. MENZIES, O.B.E., Broomhills, Liberton, Edinburgh.
	RALPH S. MACWILLIAM, Garguston, Muir-of-Ord, Ross-shire.

Year of
Election.

Extraordinary Directors.

1944	{	Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
		JAMES R. LUMSDEN of Arden, Dumbartonshire.
		JAMES PATON, Kirkness, Glencraig.
		ALEXANDER CORMACK, Dunkyan, Killearn, by Glasgow.
1945	{	WILLIAM I. ELLIOT, Middleton, Stow, Midlothian.
		JOHN KERR, Yorkston, Gorebridge, Midlothian.
		ANDREW R. PAGE, Argyll Estates Office, Inveraray.
		RICHARD J. SINGER, F.I.A. (Scot.), Wallets' Marts, Ltd., Castle Douglas, Kirkcudbrightshire.
		JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.

Show Division Directors.

D. M. ALLAN, Ballintomb, Grantown-on-Spey.
 ALEXANDER CALDER, Shamrock Lea, Kirkwall.
 JAMES CAMERON, Balnakyle, Munlochy.
 Major A. D. CAMPBELL, Stanstill, Wick.
 GEORGE J. GRANT, Pulrossie, Dornoch.
 KENNETH P. MACGILLIVRAY, Kirkton, Bunchrew, Inverness.
 Captain R. MACLEAN of Drynie, North Kessock, by Inverness.
 WILLIAM PETRIE, Wester Manbeen, Elgin.
 Provost HUGH ROSS, Town House, Inverness.
 ANDREW WILSON, Broombank, Auldearn, Nairn.

Chief Officials, &c.

The EARL OF HOME, K.T., The Hirscl, Coldstream, *Treasurer*.
 ALEXANDER MURDOCH, East Hallside, Cambuslang, *Honorary Secretary*.
 JOHN STIRTON, O.B.E., 8 Eglinton Crescent, Edinburgh, *Secretary*.
 THOMAS W. RUSSELL, *Chief Clerk*.
 JOHN WATT, *Second Clerk*.
 GEORGE JAMES GREGOR, C.A., 8 York Place, Edinburgh, *Auditor*.
 *Master of Works*.
 A. E. CAMERON, M.A., D.Sc., University of Edinburgh 10 George Square, Edinburgh, *Consulting Zoologist*.
 The Very Rev. CHARLES L. WARR, D.D., 63 Northumberland Street, Edinburgh, *Chaplain*.
 TODS, MURRAY & JAMIESON, W.S., 66 Queen Street, Edinburgh, *Law Agents*.
 WILLIAM BLACKWOOD & SONS LTD., 45 George Street, Edinburgh, *Publishers*.
 HAMILTON & INCHES, Princes Street, Edinburgh, *Silversmiths*.
 ALEXANDER KIRKWOOD & SON, 9 St James' Square, Edinburgh, *Medallists*.
 JOHN MENZIES & CO. LTD., 6 Castle Street, Edinburgh, *Advertising Agents*.
 FRANK REID, 55 Blenheim Place, Aberdeen, *Showyard Erector*.
 J. P. LAUDER, *Officer and Caretaker*.

Chairman of Board of Directors.

JAMES R. LUMSDEN of Arden, Dumbartonshire.

Chairmen of Committees.

1. *Argyll Naval Fund* . . . JAMES R. LUMSDEN of Arden, Dum-
bartonshire.
2. *Finance, Chambers, and Law* The EARL OF HOME, K.T., The Hirsel,
Coldstream.
3. *Publications* . . . Major R. F. BREBNER, C.B.E., The
Leuchold, Dalmeny House, Edin-
burgh.
4. *Shows* . . . Captain IAN S. ROBERTSON, Linkwood,
Elgin.
5. *Implements and Machinery* . Sir JOSHUA ROSS-TAYLOR, Mungoswalls,
Duns.
6. *Science* . . . J. W. ALEXANDER, M.V.O., Langshaw,
Moffat.
7. *General Purposes* . . . JAMES R. LUMSDEN of Arden, Dum-
bartonshire.
8. *Education* . . . Sir JOSHUA ROSS-TAYLOR, Mungoswalls,
Duns.
9. *Office-bearers* . . . JAMES R. LUMSDEN of Arden, Dum-
bartonshire.

COMMITTEES FOR 1945-1946.

1. ARGYLL NAVAL FUND.

JAMES R. LUMSDEN of Arden, Dumbartonshire, *Convener*.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 Sir GEORGE I. CAMPBELL of Succoth, Bt., Crarae Lodge, Minard, Argyll.
 IAN M. CAMPBELL, Bal Blair, Invershin.
 Captain JAMES CRAIG, Gwydyr House, Comrie Road, Crieff.
 JAMES DURNO, Crichtie, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
 J. E. KERR of Harviestoun, Dollar.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 ANDREW R. PAGE, Argyll Estates Office, Inveraray.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

2. FINANCE, CHAMBERS, AND LAW.

The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *Convener*.
 J. W. ALEXANDER, M.V.O., Langshaw, Moffat.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 IAN M. CAMPBELL, Bal Blair, Invershin.
 JAMES DURNO, Crichtie, Inverurie.
 GEORGE GRANT of Glenfarclas, Blacksboat.
 J. E. KERR of Harviestoun, Dollar.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 IAN C. MENZIES, O.B.E., Broomhills, Liberton, Edinburgh.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
 GEORGE JAMES GREGOR, C.A., Auditor, *ex officio*.

3. PUBLICATIONS.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh, *Convener*.
 J. W. ALEXANDER, M.V.O., Langshaw, Moffat.
 IAN M. CAMPBELL, Bal Blair, Invershin.
 JAMES DURNO, Crichtie, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
 GEORGE GRANT of Glenfarclas, Blacksboat.
 J. E. KERR of Harviestoun, Dollar.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.

WILLIAM MONTGOMERY, Banks, Kirkcudbright.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 Captain IAN S. ROBERTSON, Linkwood, Elgin.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 Captain R. J. THOMSON, Kaimes, West Linton.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

4. SHOWS.

Captain IAN S. ROBERTSON, Linkwood, Elgin, *Convener*.
 JAMES PATON, C.B.E., Kirkness, Glencraig, *Vice-Convener*.
 R. SCOTT AITON, M.C., Legerwood, Earlstoun.
 J. W. ALEXANDER, M.V.O., Langshaw, Moffat.
 D. M. ALLAN, Ballintomb, Grantown-on-Spey.
 WILLIAM ALLISON, Almond Hill, Kirkliston.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 WILLIAM BROWN, Craigton, Bishopton, Renfrewshire.
 ALEXANDER CALDER, Shamrock Lea, Kirkwall.
 JAMES CAMERON, Balnakyle, Munlochy.
 Major A. D. CAMPBELL, Stanstill, Wick.
 IAN M. CAMPBELL, Bal Blair, Invershin.
 W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
 JAMES CLARK, Windlaw Farm, Carmunnock.
 ALEXANDER CORMACK, Dunkyan, Killearn, by Glasgow.
 Captain JAMES CRAIG, Gwydyr House, Comrie Road, Crieff.
 PETER W. CRAWFORD, Dryfeholm, Lockerbie.
 JAMES DURN, Crichtie, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
 WILLIAM I. ELLIOT, Middletoun, Stow, Midlothian.¹
 ALEXANDER FORBES, Rettie, Banff.
 GEORGE GRANT of Glenfarclas, Blacksboat.
 GEORGE J. GRANT, Pulrossie, Dornoch.
 JAMES JOHNSTON, Dunmore Home Farm, Falkirk.
 J. E. KERR of Harviestoun, Dollar.
 JOHN KERR, Yorkston, Gorebridge, Midlothian.
 JAMES KILPATRICK, Craigie Mains, Kilmarnock.
 WILLIAM H. LAWSON, Frithfield, Anstruther.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 KENNETH P. MACGILLIVRAY, Kirkton, Bunchrew, Inverness.
 JAMES M'LAREN, Alton, Stirling.
 Captain R. MACLEAN of Drynie, North Kessock, by Inverness.
 RALPH S. MACWILLIAM, Garguston, Muir-of-Ord, Ross-shire.
 IAN C. MENZIES, O.B.E., Broomhills, Liberton, Edinburgh.
 A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.
 WILLIAM MONTGOMERY, Banks, Kirkcudbright.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JOHN NIVEN, Gloagburn, Tibbermore.
 ANDREW R. PAGE, Argyll Estates Offices, Inveraray.
 WILLIAM PETRIE, Wester Manbeec, Elgin.
 JOHN N. REID, Cromley Bank, Ellon.
 Provost HUGH ROSS, Town House, Inverness.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 WILLIAM D. SIMPSON, Highfield, North Berwick.
 RICHARD J. SINGER, F.I.A.(Scot.), Wallets' Marts, Ltd., Castle Douglas.

MATTHEW TEMPLETON, Goshen Bank, Kelso.
 Captain R. J. THOMSON, Kaimes, West Linton.
 FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
 THOMAS A. WEDDERSPOON, Castleton, Eassie, Angus.
 ANDREW WILSON, Broombank, Auldearn, Nairn.
 JAMES WITHER, Awhirk, Stranraer.
 JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

5. IMPLEMENTS AND MACHINERY.

Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns, *Convener*.
 JAMES PATON, C.B.E., Kirkness, Glencraig, *Vice-Convener*.
 R. SCOTT AITON, M.C., Legerwood, Earlstoun.
 J. W. ALEXANDER, M.V.O., Langshaw, Moffat.
 WILLIAM ALLISON, Almond Hill, Kirkliston.
 ALEXANDER CORMACK, Dunkyan, Killearn, by Glasgow.
 PETER W. CRAWFORD, Dryfeholm, Lockerbie.
 JAMES DURNO, Crichtie, Inverurie.
 ALEXANDER FORBES, Rettie, Banff.
 J. E. KERR of Harviestoun, Dollar.
 JOHN KERR, Yorkston, Gorebridge, Midlothian.
 WILLIAM H. LAWSON, Frithfield, Anstruther.
 JAMES M'LAREN, Alton, Stirling.
 IAN C. MENZIES, O.B.E., Broomhills, Liberton, Edinburgh.
 A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JOHN NIVEN, Gloagburn, Tibbermore.
 JOHN N. REID, Cromley Bank, Ellon.
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 WILLIAM D. SIMPSON, Highfield, North Berwick.
 FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
 THOMAS A. WEDDERSPOON, Castleton, Eassie, Angus.
 JAMES WITHER, Awhirk, Stranraer.
 JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
 JAMES R. LUMSDEN of Arden, Dumbartonshire, Chairman of Board of Directors, *ex officio*.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

6. SCIENCE.

J. W. ALEXANDER, M.V.O., Langshaw, Moffat, *Convener*.
 R. SCOTT AITON, M.C., Legerwood, Earlstoun, *Vice-Convener*.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 WILLIAM BROWN, Craigton, Bishopton, Renfrewshire.
 IAN M. CAMPBELL, Bal Blair, Invershin.
 W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
 JAMES CLARK, Windlaw Farm, Carmunnock.
 Captain JAMES CRAIG, Gwydyr House, Comrie Road, Crieff.
 JAMES DURNO, Crichtie, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
 WILLIAM I. ELLIOT, Middletoun, Stow, Midlothian.
 GEORGE GRANT of Glenfarclas, Blacksboat.
 J. E. KERR of Harviestoun, Dollar.

JAMES KILPATRICK, Craigie Mains, Kilmarnock.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 RALPH S. MACWILLIAM, Garguston, Muir-of-Ord, Ross-shire.
 A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.
 WILLIAM MONTGOMERY, Banks, Kirkcudbright.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 ANDREW R. PAGE, Argyll Estates Office, Inveraray.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 Captain IAN S. ROBERTSON, Linkwood, Elgin.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 WILLIAM D. SIMPSON, Highfield, North Berwick.
 RICHARD J. SINGER, F.I.A.(Scot.), Wallets' Marts, Ltd., Castle Douglas.
 MATTHEW TEMPLETON, Goshen Bank, Kelso.
 Captain R. J. THOMSON, Kaimes, West Linton.
 FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
 JAMES WITHER, Awhirk, Stranraer.
 JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.
 A. E. CAMERON, M.A., D.Sc., University of Edinburgh, 10 George Square,
 Edinburgh, Consulting Zoologist, *ex officio*.

7. GENERAL PURPOSES.

JAMES R. LUMSDEN of Arden, Dumbartonshire, Chairman of Board of
 Directors, *Convener*.
 R. SCOTT AITON, M.C., Legerwood, Earlston.
 J. W. ALEXANDER, M.V.O., Langshaw, Moffat.
 WILLIAM ALLISON, Almond Hill, Kirkliston.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
 JAMES DURN0, Crichton, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dun-
 fermline.
 WILLIAM I. ELLIOT, Middletoun, Stow, Midlothian.
 JAMES JOHNSTON, Dunmore Home Farm, Falkirk.
 J. E. KERR of Harviestoun, Dollar.
 IAN C. MENZIES, O.B.E., Broomhills, Liberton, Edinburgh.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 WILLIAM D. SIMPSON, Highfield, North Berwick.
 MATTHEW TEMPLETON, Goshen Bank, Kelso.
 Captain R. J. THOMSON, Kaimes, West Linton.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

8. EDUCATION.

Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns, *Convener*.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 JOHN STIRTON, O.B.E., 8 Eglinton Crescent, Edinburgh.

9. OFFICE-BEARERS.

Constitution : (1) The four Ordinary Directors for the Division in which the Show for the year is to be held (with the exception of one retiring next year) ; (2) one Ordinary Director from each of the other Show Divisions ; and (3) the Chairman of the Board, Treasurer, and Hon. Secretary, *ex officio*.

<i>Perth</i>	. JOHN NIVEN, Gloagburn, Tibbermore.
<i>Glasgow</i>	. A. W. MONTGOMERIE, O.B.E., Westburn Farm, Cambuslang.
<i>Aberdeen</i>	. JAMES DURNO, Crichtie, Inverurie.
<i>Borders</i>	. R. SCOTT AITON, M.C., Legerwood, Earlston.
<i>Stirling</i>	. Captain JAMES CRAIG, Gwydyr House, Comrie Road, Crieff.
<i>Dumfries</i>	. JAMES WITHER, Awhirk, Stranraer.
<i>Edinburgh</i>	. WILLIAM D. SIMPSON, Highfield, North Berwick.
<i>Inverness</i>	. IAN M. CAMPBELL, Bal Blair, Invershin, Sutherland.

JAMES R. LUMSDEN of Arden, Dumbartonshire, Chairman of Board of Directors, *ex officio*.

The EARL OF HOME, K.T., The Hirsel, Coldstream, Treasurer, *ex officio*.

ALEXANDER MURDOCH, East Hallside, Cambuslang, Honorary Secretary, *ex officio*.

REPRESENTATIVES ON OTHER BODIES.

National Agricultural Examination Board and National Dairy Examination Board.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 JAMES R. LUMSDEN of Arden, Dumbartonshire.
 ALEXANDER MURDOCH, East Hallside, Cambuslang.
 JAMES PATON, C.B.E., Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 JOHN STIRTON, O.B.E., 8 Eglinton Crescent, Edinburgh.

Edinburgh and East of Scotland College of Agriculture.

JOHN STIRTON, O.B.E., 8 Eglinton Crescent, Edinburgh.

West of Scotland Agricultural College.

JAMES R. LUMSDEN of Arden, Dumbartonshire.

Aberdeen and North of Scotland College of Agriculture.

JAMES DURNO, Crichtie, Inverurie.

Royal (Dick) Veterinary College.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.

Glasgow Veterinary College.**ALEXANDER MURDOCH**, East Hallside, Cambuslang.**Animal Diseases Research Association.****Major R. F. BREBNER**, C.B.E., The Leuchold, Dalmeny House, Edinburgh.**Scottish Agricultural Organisation Society, Ltd.****WILLIAM ALLISON**, Almond Hill, Kirkliston.**WILLIAM D. SIMPSON**, Highfield, North Berwick.**Scottish Milk Records Association.****JAMES KILPATRICK**, Craigie Mains, Kilmarnock.**Captain IAN S. ROBERTSON**, Linkwood, Elgin.**JAMES WITHER**, Awhirk, Stranraer.**National Trust for Scotland.****Sir JOSHUA ROSS-TAYLOR**, Mungoswalls, Duns**Royal Scottish Agricultural Benevolent Institution.****JAMES R. LUMSDEN** of Arden, Dumbartonshire.**Association for the Preservation of Rural Scotland.****J. W. ALEXANDER**, M.V.O., Langshaw, Moffat.**Scottish Country Industries Development Trust.****The EARL OF ELGIN AND KINCARDINE**, K.T., C.M.G., Broomhall, Dunfermline.**Scottish Association of Young Farmers' Clubs.****JAMES PATON**, C.B.E., Kirkness, Glencraig.**SCOTTISH PLANT REGISTRATION STATION.****Standing Committee of Management.****Major R. F. BREBNER**, C.B.E., The Leuchold,
Dalmeny House, Edinburgh.**WILLIAM D. SIMPSON**, Highfield, North Berwick.**JAMES WITHER**, Awhirk, Stranraer.} *Appointed for
5 years from 1st
January 1946.*

MEETINGS.

General Meetings.—By the Charter the Society must hold two General Meetings each year, and, under ordinary circumstances, they are held in the months of January and June, for the election of Members and other business. Twenty a quorum.

By a resolution of the General Meeting held on 15th January 1879, a General Meeting of Members is held in the Showyard on the occasion of the Annual Show.

With reference to motions at General Meetings, Bye-Law No. 19 provides that—"At General Meetings of the Society no motion or proposal (except of mere form or courtesy) shall be submitted or entertained for immediate decision unless notice thereof has been given two weeks previously to the Board of Directors, without prejudice, however, to the competency of a motion or proposal, of which due notice has not been given, being remitted to the Directors for consideration, and thereafter being disposed of at a future General Meeting."

Directors' Meetings.—The Board of Directors meet (except when otherwise arranged) on the first Wednesday of each month from November to June, inclusive, at 1.30 p.m., and occasionally as business may require, on a requisition by three Directors to the Secretary, or on intimation by him. Seven a quorum.

Committee Meetings.—Meetings of the various Committees are held as required.

Nomination of Directors.—Meetings of Members, for the purpose of nominating Directors to represent the Show Divisions on the Board for the year 1947-1948, will be held at the places and on the days after-mentioned :—

DIVISION.		
1. <i>Edinburgh.</i>	Market Buildings, Gorgie, Edinburgh	Wed., 29th Jan. 1947, at 1.
2. <i>Glasgow.</i>	Central Station Hotel, Glasgow	Wed., 12th Feb. 1947, at 1.
3. <i>Stirling.</i>	Golden Lion Hotel, Stirling	Thur., 13th Feb. 1947, at 1.30.
4. <i>Perth.</i>	Station Hotel, Cupar	Tues., 18th Feb. 1947, at 2.30.
(The Meeting will be held in 1948 at Perth.)		
5. <i>Borders.</i>	County Buildings, St Boswells	Thur., 20th Feb. 1947, at 3.
6. <i>Inverness.</i>	Station Hotel, Inverness	Tues., 25th Feb. 1947, at 2.
7. <i>Aberdeen.</i>	Imperial Hotel, Aberdeen	Fri., 28th Feb. 1947, at 2.30.
8. <i>Dumfries.</i>	King's Arms Hotel, Dumfries	Wed., 12th March 1947, at 2.30.

The nomination of a Proprietor or other Member paying the higher subscription must be made in the 1st, 2nd, 4th and 5th Divisions ; and the nomination of a Tenant-Farmer or other Member paying the lower subscription in the 3rd, 6th, 7th and 8th Divisions.

A Member who has served as an Ordinary Director for a term of four years is not eligible to be nominated again till after the lapse of at least one year. An Extraordinary Director may, however, be nominated as an Ordinary Director.

GENERAL SHOW.

Since the outbreak of War in September 1939 no Shows have been held.

EXAMINATIONS.

Agriculture.—In order to assist candidates at the English and Welsh Colleges, the Examination in 1946 for the National Diploma in Agriculture will be held (1) at Edinburgh on Wednesday, 3rd April, and following days. Applications close on Wednesday, 20th February; (2) at Leeds on Tuesday, 9th July, and following days. Applications close on Monday, 20th May.

Dairying.—The Examination in 1946 (Scottish Centre) for the National Diploma in Dairying will be held at the Dairy School for Scotland, Auchincruive, Ayr: *Written*—On Tuesday, Wednesday, and Thursday, 3rd, 4th, and 5th September. *Oral and Practical*—On Monday, 16th September, and following days. Applications close on Wednesday, 31st July.

Forestry.—The Final Examination for the Society's First and Second-Class Certificates in Forestry was held in 1935.

In view of the institution of Examinations for Certificates and Diplomas in Forestry by the Royal Scottish Forestry Society, and by arrangement with that Society, the Board of Directors of the Highland and Agricultural Society of Scotland resolved in 1935 to cease holding further Examinations for the First and Second-Class Certificates, and that, in future, the granting of Certificates and Diplomas be left in the hands of the Royal Scottish Forestry Society.

All communications in connection with Examinations in Forestry should now be addressed to the Secretary, Royal Scottish Forestry Society, 8 Rutland Square, Edinburgh 1.

NATIONAL DIPLOMA IN AGRICULTURE

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

From 1858 to 1899 the Society held an annual Examination for Certificate and Diploma in Agriculture. In 1873 the Free Life Membership of the Society was granted to winners of the Diploma. In 1882 permission was given to holders of the Diploma to append the letters F.H.A.S. to their names. These arrangements terminated in 1899.

In 1898 it was resolved by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland to discontinue the independent Examinations in Agriculture held by the two Societies, and to institute in their stead a Joint-Examination for a NATIONAL DIPLOMA IN AGRICULTURE (N.D.A.). This Examination is now conducted under the management of "The National Agricultural Examination Board" appointed by the two Societies. The first Joint Examination was held in 1900.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF AGRICULTURE

EXAMINATIONS IN 1946.

1. The Societies may hold conjointly, under the management of the National Agricultural Examination Board appointed by them, an Annual Examination in the Science and Practice of Agriculture, at a convenient centre.

2. Candidates who pass the Examination will receive the National Diploma in Agriculture—the Diploma to be distinguished shortly by the letters "N.D.A."

3. The Examination will be conducted by means of written papers and oral examinations.

4. In order to be eligible to sit for the Board's Examination in Agriculture, a candidate must—

(a) Present a certificate from a recognised Agricultural College that his attainments in the subjects of *General Botany, Geology, General Chemistry, Physics, and Mechanics*, as attested by class and other examinations, are, in the opinion of the authorities of the College, such as to justify his admission to the Board's Examination; *or*

(b) Produce evidence that he has passed the 1st B.Sc. or the Intermediate Examination in Science of a British University; *or*

(c) Present a School Certificate awarded by a British University Examination Board, and produce evidence that he has continued his study of science for at least a year and has obtained a certificate in Physics, Chemistry, and Botany at the Higher Certificate Examination of a British University Examination Board; *or*

(d) Present a Leaving Certificate in Science (including Chemistry and Botany) of the Scottish Education Department.

5. In the case of students who satisfy the Board that they have not had the facilities for obtaining the foregoing certificates, the Board will be prepared to consider evidence of equivalent attainment. [Applications under this rule must be lodged *three months* before the date of the annual examination.]

6. *Before sitting for the PRACTICAL AGRICULTURE and FARM MACHINERY AND IMPLEMENTS papers, all candidates must produce evidence of possessing a practical knowledge of Agriculture obtained by residence on a farm in the British Isles for a period or periods (not more than two) covering a complete year of farming operations.*

7. Candidates will have the option of taking the whole of the following nine papers at one time, or of sitting for a group of *any three, four, or five* in the first year and the remaining subjects (at one examination) within the next two years:—

SUBJECT.	Maximum Marks.	Pass Marks.
1. Practical Agriculture (First Paper)	400	240
2. Practical Agriculture (Second Paper)	400	240
3. Farm Machinery and Implements	300	150
4. Land Surveying and Farm Buildings	100	50
5. Agricultural Chemistry	200	100
6. Agricultural Botany	200	100
7. Agricultural Book-keeping	200	100
8. Agricultural Zoology	100	50
9. Veterinary Science and Hygiene	200	100
	<hr/> 2100	<hr/> 1130

NOTE.—Candidates taking the Examination in two groups of subjects are recommended to take Agricultural Chemistry and Agricultural Botany in the first group.

8. A candidate who obtains not less than three-fourths (1575) of the aggregate maximum marks (2100) in the entire Examination will receive the Diploma with Honours, provided that he obtains not less than three-fourths (600) of the maximum marks (800) in the two Practical Agriculture papers.

9. Candidates electing to take the entire Examination at one time and failing in not more than three subjects may appear for these subjects in the following year. Failure in more than three subjects will be regarded as failure in the whole Examination.

10. In the case of candidates electing to take the Examination in two groups—

(a) A candidate appearing for a group of *three* subjects and failing in a single subject may, *in the case of a first group*, appear for that subject along with the second group, or, *in the case of a second group*, in the following year. Failure in more than one subject will be regarded as failure in the group.

(b) A candidate appearing for a group of *four* or more subjects and failing in not more than two subjects may, *in the case of a first group*, appear for these subjects along with the second group, or, *in the case of a second group*, in the following year. Failure in more than two subjects will be regarded as failure in the group.

11. Non-returnable fees must be paid by candidates as follows :—

Entire Examination	. . . . .	Six guineas.
Group of subjects	. . . . .	Three guineas.
Reappearance for any subjects	. . . . .	10/6 per subject.

12. The Board reserve the right to postpone, abandon, or in any way, or at any time, modify an Examination, and also to decline at any stage to admit any particular candidate to the Examination.

EXAMINATIONS IN 1946.

In order to assist candidates at the English and Welsh Colleges, the Board have decided to hold two Examinations in 1946.

Candidates will be permitted to appear at EITHER of these, but not at both.

The Examinations will be held as under :—

SCOTLAND.—At the University of Edinburgh and in the Chambers of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, on WEDNESDAY, 3rd APRIL 1946, and following days. Last date for receiving Applications, WEDNESDAY, 20th FEBRUARY 1946.

ENGLAND.—At the University of Leeds, on TUESDAY, 9th JULY 1946, and following days. Last date for receiving Applications, MONDAY, 20th MAY 1946.

Forms of Application for permission to sit at either Examination may be obtained from : “The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.1.” or from “The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh, 12.”

SYLLABUS OF SUBJECTS OF EXAMINATION.

PRACTICAL AGRICULTURE.

1.—FIRST PAPER.

1. *British Farming.*—Arable, stock-raising, dairying—Approximate areas covered by the different systems—Typical examples of each—Area in Great Britain under chief crops—Numbers of live stock—The recent history of agriculture—Short summary of agricultural returns.

2. *Climate.*—The effect of climate on farming practice—Rainfall—Temperature—Prevailing winds—Weather forecasts.

3. *Soils.*—The influence of geological formations on the systems of farming—Classification of soils—Character and composition—Suitability for cultivation. Reclamation—Drainage—Irrigation—Warping—Application of lime and marl—Bare fallows—Tillage—Subsoiling—Deep and thorough cultivation.

4. *Manures.*—The manures of the farm—The treatment of farm-yard manure—The disposal of liquid manure and sewage—General manures—Special manures—Field trials of manures—The application of manures—Period of application and amounts used per acre—Unexhausted value of manures and feeding-stuffs.

5. *Crops.*—Wheat, barley, oats, rye, beans, peas, potatoes, turnips, swedes, mangolds, sugar beet, forage plants, hops, and other crops—Their adaptation to different soils and climates—Varieties—Selection of seed—Judging seeds—Cultivation, weeds and parasitic plants, best methods of prevention and eradication—Harvesting—Storing—Cost of production—Improvement of crops by selection and hybridising—Field trials—Methods which the farmer may adopt—Selection to resist disease—The principles of rotations—Rotations suitable for different soils and climates—Rotations and the maintenance of fertility—Green manuring—Leguminous crops in rotation—Catch crops—The advantages and disadvantages of rotations—Specialised farming—Management of Orchards.

2.—SECOND PAPER.

6. *Live Stock.*—The different breeds of British live stock—Their origin, characteristics, and comparative merits—Suitability for different districts—Breeding—General principles—Selection—Mating—Crossing—Rearing and general management—Breeding and rearing of horses, cattle, sheep, pigs, and poultry. Rearing colts and raising store stock—The foods of the farm—Their composition and suitability for different classes of stock—Purchased foods—Composition and special value—Rations for different kinds and ages of stock—Cost of producing beef, mutton, pork, and milk—Cost of feeding farm horses.

7. *The disposal of Crops, Produce, and Stock.*—Marketing grain and other crops—Sale of stock—Live weight—Dead weight.

8. *Milk.*—The production and treatment of milk—The manufacture of cheese, butter, &c.—The utilisation of by-products.

9. *Farming Capital.*—Calculations of the stocking and working of arable, stock, and dairy farms—Farm valuations—Rent and taxes.

10. *Labour.*—Organisation of labour—piece-work, time-work—labour costings.

11. *Renting a Farm.*—Indications of condition, productive power, and stock-carrying capacity—Leases—Conditions of occupancy.

N.B.—*It is essential that a candidate know his subject practically, and that he satisfy the Examiner of his familiarity with farm work and management.*

3.—FARM MACHINERY AND IMPLEMENTS.

1. *Power.*—The principle of action, construction, method of working, also care and management of steam engines and boilers, gas, oil and petrol engines and agricultural tractors. Cost and working expenses in connection with the above. Estimation of the brake horse-power of engines. Power derived from water. Measurement of the quantity of water flowing in a stream. General arrangement of water-power plants. Water-wheels. Turbines. Pumps—

principle of action and construction. Flow of water through pipes. Hydraulic ram. Windmills.

2. *Agricultural Implements and Machinery.*—The mode of action and the general principles involved in the construction and working of farm implements and machinery. Arrangements of machinery with respect to the power plant. Pulleys and belting. Shafting and bearings. Lubrication. Lifting appliances. Strength and care of chains. Concrete and its use in the construction of simple foundations for engines and machines.

3. *Implements of Cultivation.*—Ploughs—Cultivators—Grubbers—Harrows—Drills. Manure Distributors. Seeding and planting implements.

4. *Implements of Harvesting.*—Mowing and Reaping machines—Combine harvesters—Pick-up balers—Rakes—Teddies—Elevators—Potato raisers—Beet harvesters.

5. *Implements of Transit.*—Carts, waggons, rick lifters, tractors.

6. *Threshing and Food-preparing Machinery.*—Threshing machines, stationary and portable—Screen Winnowers—Hummelers, Chaff cutters—Pulpers—Cake breakers.

7. *Dairy Appliances.*—Milking machines—Cream separators—Churns and other butter-working appliances—Milk delivery cans—Cheese-making utensils—Vats and presses.

N.B.—Candidates are expected to have had some experience with agricultural machinery and implements under actual working conditions, and to be capable of illustrating their answers, when necessary, by intelligible sketches or diagrams.

4.—LAND SURVEYING AND FARM BUILDINGS.

1. The use and adjustment of instruments employed in Surveying and Levelling other than the Theodolite.

2. Land surveying by chain, Plotting from field book, and determination of areas surveyed. The simpler "field problems."

3. Levelling and plotting from field book.

4. A knowledge of the various classes of maps published by the Ordnance Survey Department and their Scales.

5. *Roads and Fences.*—The construction and maintenance of farm roads, fences, and ditches.

6. *Land Drainage.*—Methods of draining; mole and pipe drains; cost of construction and maintenance.

7. *Buildings.*—Buildings required on different classes of farms—Economical arrangement of farm buildings—Materials—Construction—Ventilation—Drainage—Water supply—Dimensions of dairy, stables, cow-sheds, yard, courts, and piggeries—Accommodation for power—Implement, machinery, and cart sheds—Hay and grain sheds—Shelter sheds—Storage of manure.

N.B.—Each candidate should have with him at the Examination a pair of compasses, scales of equal parts, including scales of one chain to the inch, 4 feet to the inch, 8 feet to the inch, and the scale fitting the Ordnance Map, $\frac{1}{2500}$ or 25·344 inches to the mile, a small protractor, a set-square, and a straight-edge about 18 inches in length.

5.—AGRICULTURAL CHEMISTRY.

1. *The Atmosphere*.—Its composition and relations to plant and animal life.

2. *Water*.—Rain water—Soil water and drainage—Drinking water—Sewage and irrigation.

3. *The Soil*.—Origin, formation, and classification of soils—Sampling—Analysis—Composition of soils—The chemical and physical properties of soils—The water and air of the soil—Biological changes in the soil—The soil in relation to plant growth—Fertility—Causes of infertility—Improvement of soils.

4. *Manures*.—Theories of manuring—Classification of manures—Origin, nature, and characteristics of manures—Manufacture of manures—Composition, analysis, adulteration, and valuation of manures—Farmyard manure and other natural manures—Green-manuring—Liming, marling, claying—Artificial manures, their origin and manufacture—Fertilisers and Feeding Stuffs Act—Sampling of manures.

5. *Poisons, Antiseptics, and Preservatives*.—General chemical composition and character of insecticides, fungicides, antiseptics, and preservatives used on the farm.

6. *Plants and Crops*.—Constituents of plants—Assimilation and nutrition of plants—Sources of the nitrogen and other constituents of plants—Germination—Action of enzymes—Composition and manurial requirements of farm crops—Food products derived from crops—Manuring experiments.

7. *Animals*.—Composition of animal body—Animal nutrition—Digestion—Assimilation, metabolism, respiration, and excretion.

8. *Foods and Feeding*.—Constituents of foods—Origin, nature, and composition of chief feeding stuffs—Sampling, analysis, and adulteration of foods—Nutritive value and digestibility of food—Functions of chief food constituents—Energy values—Vitamins—Relation of foods to the production of work, meat, milk, and manure—Manurial residues of foods.

9. *Dairy Chemistry*.—The composition of milk, cream, butter, cheese, &c.—Conditions which influence the composition of milk and milk products—Action of ferments and enzymes on milk and milk products—Milk-testing—Analysis and adulteration of dairy products.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

6.—AGRICULTURAL BOTANY.

In addition to a *general knowledge* of the morphology, histology, and physiology of plants, candidates will be expected to possess a *detailed knowledge* of the following subjects:—

The classification of plants of importance in agriculture as shown by a detailed study of the genera, species, and botanical varieties of the British Crop Plants and Weeds included in the following families:—

Ranunculaceæ.	Umbelliferae.	Chenopodiaceæ.
Cruciferae.	Compositæ.	Polygonaceæ.
Caryophyllaceæ.	Solanaceæ.	Liliaceæ.
Leguminosæ.	Scrophulariaceæ.	Gramineæ.
Rosaceæ.	Labiatae.	

British grasses of agricultural importance : recognition of, at any stage of growth. Habitats of important species. Constitution of the grass flora of good meadows and pastures. Composition of seed mixtures for temporary and permanent leys on various soils. The effects of artificial manures on the flora of grass land.

The weeds of arable and grass land. Poisonous and parasitic weeds. Methods of distribution by seed and vegetatively : of eradication. Weeds as soil indicators. Recognition of the seeds of the common weeds, particularly those characteristically found in clover, grass, &c., seed.

The chief varieties of wheat, barley, oats, clovers, roots, and other farm crops ; their suitability for various climatic and soil conditions. The identification of the more important types of cereals by means of their grain characters. Characteristics of good and bad samples of cereals.

Identification of materials used in feeding cakes and meals.

Plant-breeding. Principles of heredity in plants. Pure lines. Fluctuating variability. Selection.

Disease in plants. Diseases due to the effects of parasitic fungi. Resistance to disease : conditions affecting. Fungoid diseases scheduled from time to time by the Ministry of Agriculture and Fisheries.

Yeasts and fermentation.

The general outlines of bacteriology : nitrogen fixation, nitrification, and denitrification. Putrefaction and the bacteriology of milk, butter, and cheese.

N.B.—Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.

7.—AGRICULTURAL BOOK-KEEPING.

1. Advantages of book-keeping to the farmer. Difficulties and how they can be overcome. Objects of book-keeping.

2. General principles of book-keeping. Double-entry system. Description and use of various books. Ledger, journal, cash-book, petty cash-book, day-books, &c. Entering transactions ; posting ; trial balance ; closing the accounts. Single-entry system.

3. Special ledger accounts : Interest, depreciation, rent and rates, improvements, private and household expenses, profit and loss and capital ; partnership accounts.

4. Bank business. Opening a bank account. Use of cheques. Deposits and overdrafts.

5. General office work ; correspondence, order notes, invoices, rendering accounts, receipts, &c. Filing systems.

6. Farm valuations for book-keeping purposes. Dates for stock-taking and principles of valuation. The farm balance-sheet.

7. Systems of farm book-keeping. Conditions that determine the most suitable system. Advantages and drawbacks of each system.

8. Accounts for the owner-occupier. Treatment of rent. Incidence of rates and tithe in England and Scotland, and their treatment as between farm and estate accounts. Improvements and upkeep and the general principles relating to maintenance claims.

9. Cost accounting. General principles and methods. Advantages, objects, difficulties.

10. Interpretation of results from ordinary and from cost accounts. Precautions necessary. Use of accounts as a guide to efficient management.

11. Income Tax. How the farmer is assessed. Preparation of Income Tax return. Treatment of Income Tax in accounts.

8.—AGRICULTURAL ZOOLOGY.

The Examination is designed to test practical knowledge, and therefore candidates will be expected to recognise the animals of agricultural importance referred to in the Syllabus.

GENERAL.

A general knowledge of the characteristics of living animals and how they differ from plants.

One-celled animals, *e.g.*, Amœba, and many-celled animals.

General outline of the classification of animals and the characters on which it is based.

Organic Evolution. Theories of Heredity.

SPECIAL.

I. *Invertebrates*.—A. The Worm Parasites of Stock. Flat and Round Worms. Structure and Life History, for example, of Liver-fluke, Tapeworm, Ascaris. The mode of life and life history of the chief worm enemies of the domesticated animals. Preventive and remedial measures.

B. The Arachnid enemies of Stock: Mange or Scab Mites, Demodex Mites, Ticks. External structure and life history. Control measures.

C. The Insect enemies of Stock: (a) External parasites, *e.g.*, gadflies, warble flies, blue-bottles, green-bottles, stable fly, ked, lice; (b) Internal parasites, *e.g.*, bot and warble flies.

D. Insects injurious to Crops: Structure and classification of insects. Mode of life and life history of the chief insect pests of agricultural crops.* Control, preventive and remedial measures—natural control; artificial control (Insecticides).

* The chief pests are detailed in Pamphlets issued by the Ministry of Agriculture and Fisheries.

E. Other invertebrates of agricultural importance, *e.g.*, earth-worms, eelworms, slugs and snails, centipedes and millepedes, gall mites.

II. *Vertebrates*.—Birds: the commoner birds of farm importance, their recognition and an estimate of their work.

Mammals: Outstanding characters for recognition, and the economic importance of:—

1. Ungulata or Hoofed Mammals, *e.g.*, horse, pig, cattle, sheep, deer.

2. Rodentia or Gnawing Mammals, *e.g.*, hares, rabbits, rats, mice, voles, squirrels.

3. Insectivora, *e.g.*, mole, hedgehog, shrew.

4. Carnivora, *e.g.*, dog, fox, polecat, stoat, weasel, badger.

N.B.—Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.

9.—VETERINARY SCIENCE AND HYGIENE.

1. Elementary anatomy and physiology of the horse, ox, sheep, and pig, and their relation to unsoundness and disease.

2. The general principles of breeding—including the physiology of reproduction, the laws of heredity, the periods of gestation, and the signs of pregnancy in the mare, cow, ewe, and sow.

3. Dentition as a means of determining the age of horses, cattle, sheep, and swine.

4. The management of farm stock in health and disease.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

WINNERS OF DIPLOMA IN 1945.

EDINBURGH EXAMINATION.

Diploma.

GEOFFREY EDWIN BARNSLEY, Harper Adams Agricultural College.

JOHN BARRETT, Royal College of Science, Dublin.

FRANCIS JAMES BENNISON, Harper Adams Agricultural College.

JOHN PERCIVAL BLENKINSOP, University of Leeds.

WALTER BOA, University of Glasgow and West of Scotland Agricultural College.

JOHN WEST BURRELL, University of Leeds.

WILLIAM COWIE, University of Glasgow and West of Scotland Agricultural College.

WINSOME DONALDSON, West of Scotland Agricultural College.

ALAN JAMES EDWARDS, Midland Agricultural College.

DAVID EXLEY, University of Leeds.

JAMES WOOSNAM GORE, University of Reading.

JEAN HEMSLEY, West of Scotland Agricultural College.

WILLIAM CHARLES JACKSON, Midland Agricultural College.

ELINOR WYN JONES, Harper Adams Agricultural College.

ALEXANDER KING, West of Scotland Agricultural College.

JOHN LOWE, West of Scotland Agricultural College.

MURDOCH MACDONALD MACCOWAN, University of Glasgow and West of Scotland Agricultural College.

IAN EDWARD M'LEAN, University of Glasgow and West of Scotland Agricultural College.

BERNARD MAHER, University of Leeds.

JOHN CHARLES MATTHEWS, University of Reading.

IAN WATSON MITCHELL, University of Glasgow and West of Scotland Agricultural College.

PHILIP ALFRED NAYLOR, University of Leeds.

ROBERT ERNEST PAGET, West of Scotland Agricultural College.

DENNIS CECIL PRICE, University of Leeds.

GEOFFREY RIGHTON, University of Reading.
 ALAN MUIRHEAD SIMPSON, West of Scotland Agricultural College.
 JAMES GORDON SMITH, West of Scotland Agricultural College.
 EDGAR STICKLAND, Midland Agricultural College.
 THOMAS UMPLEBY, University of Leeds.
 ALFRED WALSH, University of Leeds.
 JAMES CRAIG WARDROP, University of Glasgow and West of Scotland Agricultural College.
 JAMES FARQUHARSON WHITSON, University of Glasgow and West of Scotland Agricultural College.
 DENNIS FRANK WILSON, University of Leeds.
 LEONARD JOHN PATRICK WOODRUFF, University of Reading.

LEEDS EXAMINATION.

Diploma with Honours.

TREVOR JONES, Harper Adams Agricultural College.

Diploma.

PETER JOHN ALLDEN, University of Reading.
 DAVID SHARDLOW ALLEN, Midland Agricultural College.
 PETER STRETTON ALLEN, Midland Agricultural College.
 HUMPHREY GILMAN BACK, Midland Agricultural College.
 DENVER GEORGE BAGLOW, Seale Hayne Agricultural College.
 WALTER DAVIDSON BEARD, Midland Agricultural College.
 PETER BEESE, Harper Adams Agricultural College.
 ASHLEY MICHAEL BEHAGG, Harper Adams Agricultural College.
 JOSEPH ALAN BLACK, Midland Agricultural College.
 WILLIAM ERNEST GEORGE BOLT, Seale Hayne Agricultural College.
 ANNE PATRICIA BOWATER, University of Reading.
 ARTHUR PETER FYSON BUCK, Midland Agricultural College.
 JOHN PERCIVAL CALTHORPE, Midland Agricultural College.
 ANTHONY MARTIN CHART, Harper Adams Agricultural College.
 ERIC CHARLES HARRY CHASE, University of Reading.
 JAMES CLARK, University of Glasgow and West of Scotland Agricultural College.
 GEORGE DOUGLAS CLEGG, Midland Agricultural College.
 DONALD WILLIAM COOPER, University of Glasgow and West of Scotland Agricultural College.
 WILLIAM COLIN COWLISHAW, Midland Agricultural College.
 ROBERT PETER DAVIES, Midland Agricultural College.
 ROBERT SYDNEY DAVIS, Seale Hayne Agricultural College.
 PEGGY ISIS DAWSON, Midland Agricultural College.
 ROGER ALAN DUDMAN, Harper Adams Agricultural College.
 DERRICK EVERED DUNN, Harper Adams Agricultural College.
 IVOR JOHN FAULKNER, Harper Adams Agricultural College.
 ARTHUR JOHN FOX, Harper Adams Agricultural College.
 DAVID MARSH GARRATT, Harper Adams Agricultural College.
 GEORGE COLIN ROLLINSON GIBSON, Midland Agricultural College.
 IVO MICHAEL GODFREY, Midland Agricultural College.
 JOHN DERRICK BENJAMIN GRIFFIN, Seale Hayne Agricultural College.

THOMAS GARSTANG GUDGEON, Harper Adams Agricultural College.
 IAN PETER GUTHRIE, Harper Adams Agricultural College.
 PETER ALLEN HAUGHTON, Midland Agricultural College.
 PATRICK HERON, Seale Hayne Agricultural College.
 JAMES REX HOPWOOD, Seale Hayne Agricultural College.
 PETER MICHAEL HURRELL, University of Leeds.
 JOHN ALBERT JONES, University of Reading.
 WILLIAM KENNETH PRYCE JONES, Harper Adams Agricultural College.
 MARGARET GWENDOLINE KNOWLES, Midland Agricultural College.
 TOM LIEVESLEY, Midland Agricultural College.
 JOSEPHINE BERTA MARY LONGSTAFFE, Harper Adams Agricultural College.
 LESLIE MARSHALL, University of Leeds.
 DANIEL WILLIAM DAVID LANGDON MEAD, University of Reading.
 OWEN MIDDLETON, Midland Agricultural College.
 DAVID RICHARD MUMFORD, Midland Agricultural College.
 GERALD RALPH PAIN, Harper Adams Agricultural College.
 MAISIE YVONNE PRICE, Seale Hayne Agricultural College.
 ARNOLD TREVOR SMITH RAMSBOTTOM, Midland Agricultural College.
 BRYAN PETER RICHARDSON, University of Leeds.
 RALPH SAMPSON, Midland Agricultural College.
 GILBERT ERNEST WILLIAM SERCOMBE, Seale Hayne Agricultural College.
 ROBERT SIMPSON, University of Reading.
 THOMAS EDMUND ALWYNE SIMPSON, Midland Agricultural College.
 EDWARD STEVENS, Harper Adams Agricultural College.
 ARTHUR LANG STEWART, West of Scotland Agricultural College.
 CECIL DAVID TAYLOR, University of Reading.
 HERBERT SIDNEY TAYLOR, Harper Adams Agricultural College.
 PHILIP SALIZÉ TAYLOR, Midland Agricultural College.
 RALPH WILLIAM THOMPSON, Midland Agricultural College.
 PHILIP JOHN TURNER, Midland Agricultural College.
 ROBERT WILLIAM WAKELEY, Midland Agricultural College.
 BRYAN STEWART WAKELY, Seale Hayne Agricultural College.
 GERALD RONALD WATKINS, Midland Agricultural College.
 Mrs DOROTHY WESTOBY, Midland Agricultural College.
 PHILIP CHARLES WESTON, Midland Agricultural College.
 ROBERT ALAN WESTON, Midland Agricultural College.
 RAYMOND FRANK WHITWORTH, University of Reading.
 HOPKIN JOHN WILLIAMS, University of Reading.
 GEOFFREY RALPH WILSON, University of Reading.
 SYDNEY CHARLES WITTERING, Midland Agricultural College.
 CHARLES STUART YOUNG, Midland Agricultural College.

EXAMINATION PAPERS OF PAST YEARS.

Copies of papers set at past Examinations in AGRICULTURE, so far as available, may be had on application. Price 1/- per set.

Sets of N.D.A. Papers available are those for the years 1944 (April), 1944 (July), 1945 (April), 1945 (July).

NATIONAL DIPLOMA IN DAIRYING

This Examination, instituted in 1897, is conducted by "The National Dairy Examination Board," appointed jointly by the Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, and the British Dairy Farmers' Association.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF DAIRYING

EXAMINATION IN 1946.

1. The Societies may hold annually in England and Scotland, under the management of the National Dairy Examination Board appointed by them, one or more examinations for the National Diploma in the Science and Practice of Dairying, on dates and at places from time to time appointed and duly announced; the Diploma to be distinguished shortly by the letters "N.D.D."

2. Forms of entry for the Examination in England may be obtained from "The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.1." and must be returned to him duly filled up, with the entry fee, on or before 20th July 1946.

3. Forms of entry for the Examination in Scotland may be obtained from "The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh 12," and must be returned to him duly filled up, with the entry fee, on or before 31st July 1946.

4. Any candidate may enter for the Examination either in England or Scotland, but not in both, and a candidate who has once taken part in an Examination in England cannot enter for an Examination in Scotland, or *vice versa*. *An exception may be made in favour of a candidate reappearing under Regulation 10 (3) provided special application is made at the time of entry.*

5. As a preliminary to the acceptance of any application for permission to enter for the Examination, a candidate must produce:—

(1) from the Head of an approved Dairy Training College or Institute:

(a) a statement that he or she is in possession of the General School Certificate (England), the Day School Certificate Higher (Scotland), or the School Certificate of the Central Welsh Board; or a statement that his or her general education is of an equivalent standard;

- (b) a certificate testifying that he or she has satisfactorily completed courses in (i) soils, crops, rotations, cultivations, manuring of crops (other than pastures), and plant physiology; (ii) elementary chemistry, physics and mechanics, *and*
 - (c) that he or she has also attended a Diploma or Degree course in the subjects of the Examination covering at least two academic years at an approved Dairy Training College or Institute, and has satisfied the authorities of the College or Institute of his or her fitness for admission to the Examination. *This period shall include six months' instruction (consisting of not more than two periods) in practical dairy work.*
 - (d) a certificate of proficiency in soft cheese-making.
- 2) a certificate of proficiency in the milking of cows, signed by a dairy farmer, and evidence that he or she has spent at least six months in not more than two periods on an approved dairy farm and taken part in the work, both in the dairy and on the land. *This period must not run concurrently with the six months' practical training referred to in sub-section 1 (c).*
A Dairy Farm to be approved must have not fewer than fifteen cows in milk.

6. A candidate who has already taken a Degree in Agriculture of a British University, or a Diploma in Agriculture recognised by the National Dairy Examination Board, will be allowed to enter for the National Diploma in Dairying Examination after one year's subsequent training at an approved Dairy Training College or Institute, providing that such course includes at least six months' training in practical dairy work, and that he or she has spent at least six months on an approved dairy farm, and taken part in the work both in the dairy and on the land.

7. In the Examination a candidate will be required to satisfy the Examiners by means of written papers, practical work, and *viva voce*, that he or she has :—

- (1) A general knowledge of the management of a dairy farm, including the rearing and feeding of dairy stock, the candidate being required to satisfy the Examiners that he or she has had a thorough training and practical experience in all the details of dairy work as pursued on a farm.
- (2) A thorough acquaintance with the practical details of the management of a dairy, and the manufacture of butter and cheese, together with a working knowledge of the scientific principles involved in these operations.
- (3) A general knowledge of dairy book-keeping.
- (4) Practical skill in dairying, to be tested by the making of butter and cheese.

NOTE.—A candidate must be prepared to make any one of three varieties of Hard Pressed Cheese, two of which must be Cheddar and Cheshire, these three to be specified on his application form, the Examiner in Cheese-making having the option of saying, during the Examination, which a candidate shall make.

8. Candidates will have the option of :—

- (a) Taking the whole Examination at one time ; or
- (b) Taking the Examination in two parts.

A candidate taking the Examination in two parts must take the following subjects at the first sitting: DAIRY HUSBANDRY, MILK AND MILK PLANT, CREAM AND BUTTER, CHEESE AND CHEESE PRODUCTS, PRACTICAL CHEESE-MAKING AND BUTTER-MAKING; the remaining three Papers, DAIRY CHEMISTRY, DAIRY MICROBIOLOGY, and DAIRY BOOK-KEEPING, at the Examination in the following year.

9. The maximum marks obtainable and the marks required for a pass in each subject are :—

WRITTEN AND ORAL EXAMINATION—		Max.	Pass
Dairy Husbandry	(3 hours' paper)	150	90
Milk and Milk Plant	(2 hours' paper)	100	60
Cream and Butter	" "	100	60
Cheese and Cheese Products	" "	100	60
Dairy Chemistry	" "	100	60
Dairy Microbiology	" "	100	60
Dairy Book-keeping	(3 hours' paper)	100	50
PRACTICAL EXAMINATION—CHEESE-MAKING—			
(a) One of the three Hard Pressed Cheeses specified by the candidate on his form of application			
		200	150
(b) Blue-veined			
		100	75
BUTTER-MAKING			
		200	150
		<hr/>	<hr/>
		1250	815

Honours will be awarded to candidates obtaining an aggregate of 80 per cent (1000) of the maximum marks (1250) in the Examination, provided that they also obtain at least 80 per cent (360) of the maximum marks (450) in the Dairy Husbandry, Milk and Milk Plant, Cream and Butter, and Cheese and Cheese Products papers.

10. A candidate taking the whole Examination at one time :—

- (1) who fails in any part of the practical examination shall fail in the whole examination.
- (2) who fails in four or more subjects of the written examination shall fail in the whole examination.
- (3) who, having passed in the practical examination, fails in not more than three subjects of the written examination may, at the discretion of the Board, appear for those subjects in the following year.

11. A candidate taking the Examination in two parts, and failing in a single subject in the first part of the Examination, may, at the discretion of the Board, appear for that subject along with the second part; or, in the case of a single subject of the second part, in the following year.

Failure in more than one subject will be regarded as failure in that part of the Examination. Failure in any part of the Practical Examination will entail complete failure.

12. In all cases of failure, either in the whole Examination or in part thereof, the Board will require evidence of further study before a candidate is again admitted to the Examination.

13. The entrance fees will be as follows :—

For the whole Examination taken at one time	£3	3	0
For the Examination taken in two parts :			
First part	3	3	0
Second part	1	1	0
For reappearance, 10s. 6d. each subject.			

14. The Board reserve the right to postpone, to abandon, and to modify an Examination, and also to decline to admit any particular candidate to the Examination.

DATES OF EXAMINATIONS.

SCOTLAND.—At the Dairy School for Scotland, Auchincruive, Ayr. WRITTEN—TUESDAY, WEDNESDAY, and THURSDAY, 3rd, 4th, and 5th SEPTEMBER 1946. ORAL AND PRACTICAL—MONDAY, 16th SEPTEMBER 1946, and following days. Last date for receiving Applications, WEDNESDAY, 31st JULY 1946.

ENGLAND.—At the University and British Dairy Institute, Reading, TUESDAY, 3rd SEPTEMBER 1946, and following days. Last date for receiving Applications, SATURDAY, 20th JULY 1946.

SYLLABUS OF SUBJECTS OF EXAMINATION

I.—DAIRY HUSBANDRY.

Buildings of the dairy farm ; structural features, sanitation, and water supply.

Selection, stocking, and equipment of typical dairy farms ; organisation of the dairy farm.

The utilisation of the crops of the dairy farm.

Pastures and pasture management ; dried grass, silage.

Foods used on the dairy farm ; characteristics and relative value.

Live stock of the dairy farm ; essential conformation features of the dairy cow and dairy bull ; British dairy breeds ; milk recording.

Breeding of dairy stock, principles and practice ; selection, care, and management of the sire ; calf rearing ; raising of dairy heifers.

Management of dairy herds ; self-contained herds ; attested herds.

Feeding of dairy cows for milk production ; feeding standards ; construction and use of rations.

Common ailments and diseases of dairy stock : milk fever, bloat, cow pox, mastitis, contagious abortion, tuberculosis, Johne's disease, sterility, scour, hoose, notifiable animal diseases.

Hygienic milk production ; hand and machine milking ; cleaning and care of milking machines and utensils used in milk production ; milk coolers and farm sterilising equipment.

Pigs on the dairy farm ; suitable breeds for bacon and for pork production ; housing accommodation ; breeding, feeding, and management of pigs ; fattening of pigs ; pig recording ; common ailments and diseases of pigs.

II.—MILK AND MILK PLANT.

Utilisation of milk and milk products in Great Britain ; sources of supply ; the principles of organised marketing. Milk contracts.

Properties of milk.

Variations in the composition of milk ; legal minimum standards for milk ; statutory rules and orders relating to milk and milk products.

Sources of taints and contamination in milk. Abnormal milk. Flavour in milk and the contributing factors.

Grades of milk.

Food value of milk. Hard and soft curd milk.

Transportation of milk ; milk churns ; road and rail tanks ; processing of milk at milk depots ; sampling and testing of milk ; effects of heat on milk ; essentials for efficient pasteurisation ; progressive stages in milk treatment at milk plants ; weighing ; filtering ; clarifying, pumping, pasteurising, cooling, bottling, and capping ; refrigeration ; cold storage.

Disposal of wastes from milk plants.

Distribution of milk.

Special treatment of milk ; homogenisation, irradiation, stessanisation, commercial sterilisation, high temperature, short time heat treatment.

Fermented milk preparations, Yoghurt, Kefir, and cultured butter milk.

Elementary principles of condensing and drying of milk.

III.—CREAM AND BUTTER.

Cream.—Production and consumption of cream in Great Britain. Utilisation of cream ; grades of cream, regulations for the sale of cream ; different methods of obtaining cream from milk.

Operation and management of cream separators, hand and power.

Efficiency of separation ; cleaning and sterilisation of separators.

Testing of cream.

Factors influencing the flavour, physical properties, and keeping qualities of cream ; homogenisation of cream.

Pasteurisation of cream ; cooling and storage ; marketing of cream.

Cream preparations ; whipped cream, clotted cream, sterilised cream, reconstituted cream.

Cream appliances, homogenisers, cream sterilising plant, pasteurisers, cream coolers.

Ice Cream.—Types of plant used. Materials used in, and preparation of mixes. Pasteurising, ripening, freezing, and hardening.

Butter.—Production and consumption of butter in Great Britain ; sources of imports.

Food value of butter ; regulations governing the production and sale of butter.

Selection and grading of cream for butter-making.

Treatment of cream prior to churning ; heating, cooling ; preparation and use of starters.

Churning of cream ; factors affecting churning and loss of butter fat.

Washing of butter ; purity of wash water.

Methods of working and salting of butter ; quality of salt.

Packing of butter and treatment of liners and butter boxes ; storage of butter ; refrigeration in factories and in transport.

Grading and judging butter. National Mark butter. Common defects in butter and their causes.

Special systems of butter-making ; sweet cream butter ; whole milk butter ; neutralised cream butter ; whey butter.

Utilisation of by-products of butter-making ; separated milk and butter milk. Casein.

Butter-making equipment ; separators ; pasteurising plant, cream coolers, cream pumps, starter-preparing apparatus, cream ripeners, churns and butter workers. Butter packers, moulders and blenders, butter cutting, and wrapping machines.

IV.—CHEESE AND CHEESE PRODUCTS.

Production and consumption of cheese in Great Britain ; sources of imports.

Food values of cheese.

Principles of cheese-making ; varieties of cheese.

Hard-pressed cheese. Agents used in manufacturing process ; starter, colour, rennet, salt.

Milk for cheese-making ; care and management.

Detailed knowledge of the manufacture of Cheddar and Cheshire, and one of the following : Derby, Dunlop, Leicester, Gloucester, or Lancashire.

Manufacture of cheese from pasteurised milk.

Small hard-pressed cheeses : Caerphilly, Smallholder, &c.

Difficulties experienced in the manufacturing process ; causes of fast and slow working, gas formation, ropy and slimy whey.

Ripening and storage of cheese.

Grading and judging of cheese ; National Mark standards.

Marketing of cheese.

Defects in the flavour, body, and texture, and in the colour of mature cheese.

Manufacture of Stilton and Wensleydale cheeses, blue-veined and white.

Soft cheese-making.

Cream cheeses. Single and double cream cheeses.

Cheese products. Manufacture of processed cheese, and cheese spreads.

Usual cheese factory equipment and arrangement ; cheese vats,

curd knives, curd agitator, cheese press, curd mill; cheese hoops, cheese turners, paraffining apparatus, pasteurising equipment, air conditioning plant.

Utilisation of whey.

V.—DAIRY CHEMISTRY.

The principal constituents of foodstuffs and the functions they fulfil. Assimilation and digestion. Vitamins.

The nature and composition of milk, colostrum, butter, cheese, cream, separated milk, butter milk, whey, casein, and lactose.

Drying and condensation of milk and milk products.

Variation in composition of milk.

Milk souring, rennet coagulation, preparation and ripening of cheese, storage of butter, salt for dairy purposes.

Metals and their influence on milk and milk products. Taints.

Effects of heat on milk. Abnormal milk.

The sampling and analysis of milk and milk products. Freezing point test for milk.

Commercial routine analysis of foodstuffs.

Chemical aspects of water supply.

Dairy detergents and disinfectants.

N.B.—Candidates are required to bring to the Oral Examination in this subject their Laboratory notebooks certified by their teachers as being the record of their Laboratory work carried out during the course.

VI.—DAIRY MICROBIOLOGY.

GENERAL.—The bacteria, yeasts, and moulds which commonly occur in milk and dairy products; their form, classification (in the case of the bacteria—Topley and Wilson's), growth, and reproduction. Factors which control rate of growth. Fermentations of importance in dairying; causal micro-organisms and conditions which influence activity.

MILK.—Microbiology of milk production; sources of contamination, their relative importance and organisms derived from them. Normal changes produced by micro-organisms in milk. Abnormal changes; ropiness, premature curdling, gas formation, bitter, yeasty and malty flavours and flavour of roots and feeding-stuffs; causal organisms and methods of prevention. Effects of straining, centrifuging, cooling, heating, condensing, drying, and preservatives on the microflora of milk. Bacteriology of pasteurised and sterilised milk; influence of quality of raw milk. Standards for graded milks.

MILK PRODUCTS.—Starters; their propagation and management. Ripening of cream; development of normal flavour. Microbiology of butter. Ripening of hard, soft, and blue-veined cheese; factors concerned and their control. Microbiology of condensed, dried, and fermented milks. Defects of dairy products, causal organisms and

preventive measures ; butter defects—rancidity, yeasty and cheesy flavours, coloured spots ; cheese defects—gas formation, bitterness, slow acid development and excessive acidity, colour changes ; defects of condensed milk—gas formation, “ buttons,” coagulation.

DISEASES.—Diseases which may be conveyed by milk ; sources of infection. Bacteriology of tuberculosis, contagious abortion, mastitis, and methods of detection. Immunity ; vaccines. Disinfection.

WATER.—The importance of a pure water supply for the dairy and the herd. Bacteria commonly present in natural waters. Sources of contamination, the effect of pollution with sewage, water-borne disease.

LABORATORY WORK.—The microscope and its use. Staining (including Gram and Ziehl-Neelsen methods) and microscopic examination of micro-organisms. Methods of isolation and cultivation. Preparation of bile-salt broth, milk, milk agar, and Wilson’s agar. Methods for the examination of milk ; plate method, post-pasteurisation count, coliform test, Breed’s method and the methylene blue reduction, fermentation, acidity and catalase tests. Methods for tracing sources of contamination and of milk faults. Detection of thermophilic, thermoduric, and pathogenic organisms in milk. Examination of water supplies.

N.B.—Candidates are required to bring to the Oral Examination in this subject their Laboratory notebooks certified by their teachers as being the record of their Laboratory work carried out during the course.

VII.—DAIRY BOOK-KEEPING.

The interpretation of farm and dairy factory accounts and their use in farm and factory management.

General principles of double-entry book-keeping. Use of day-book, journal, ledger, cash-book, and petty-cash book. Preparation of profit and loss account, capital account, and balance-sheet. Adjustments necessary for the owner-occupier.

Analysis cash-book.

Valuations.—Bases of valuations for accounting purposes on the farm and in the dairy factory. Dates for stock-taking. Stock books and quantitative records.

Methods of accounting suitable for dairy farms with varying systems of milk disposal.

Opening and operating a bank account. Cheques, deposits, and overdrafts.

General principle of the assessment of the farmer to income tax.

WINNERS OF DIPLOMA IN 1945.

SCOTTISH CENTRE.

(All the candidates at the Scottish Centre, with two exceptions, had been students at the Dairy School for Scotland, Auchincruive, Ayr.)

Diploma.

- ELIZABETH STEWART PATERSON ADAM, Wolfelee, 54 Elvan Street, Motherwell, Lanarkshire.
- RICHARD ROYDEN AVERY, 22 North View, Westerton, by Glasgow.
- EILEEN CRAIGIE CARTER, Links, Papa Westray, Orkney Isles.
- MALCOLM EDWARD CASTLE, 7 Roberttown Lane, Liversedge, Yorks.
- ELIZABETH GREELEY CRUICKSHANK, Mill of Petty, Fyvie, Aberdeenshire.
- CHRISTINE WEIR FERGUSON, Kilmhor, Carlibar Drive, Barrhead, Renfrewshire.
- GRACE LOUISE SUTHERLAND FORBES, 178 Crieff Road, Hillyland, Perth.
- EVELYN MARGARET BUCHANAN GOUDIE, 16 Belmont Gardens, Edinburgh 12.
- JEAN HEMSLEY, Woodside, Red Row, Morpeth, Northumberland.
- ANNE HENDERSON, Newlands, Wester Essendy, Blairgowrie, Perthshire.
- CLEATOR WILLIAM KELLY, "Almeda," 61 Bray Hill, Douglas, Isle of Man.
- ELLEN DYKES MACFARLANE, "Westhouse," Strathaven, Lanarkshire.
- CATHERINE ANN M'GREGOR, Strontoiller, by Oban.
- MARION MACLEOD, Creaganan Gorma, Carloway, Stornoway, Isle of Lewis.
- MARGARET JEAN DUNCAN MACPHERSON, 16 West Chapeltown Crescent, Bearsden, Glasgow.
- FRANK RAYMOND NUTTALL, "Brooklyn," 132 Liverpool Road, Upton-by-Chester, Chester.
- ELIZABETH ELEANOR PEACOCK, Beaconsfield House, Barnard Castle, Co. Durham.
- MARY FYFE RUSSELL, 4 Eastwood Avenue, Giffnock, Glasgow.
- MOIRA CHRISTISON SMART, 41 Milton Road West, Portobello, Midlothian.
- RUBY DOROTHY SNOW, 12 Lyndhurst Drive, Sevenoaks, Kent.
- ROBERT LEWIS SUTHERLAND, 31 Sheepburn Road, Uddingston, Lanarkshire.
- EILEEN ALEXANDRA URWIN, Temple House, Anglesey Road, Kingston-on-Thames, Surrey.
- ANITA FERGUSON WHYTE, 3 Pelaw Terrace, Durham.

ENGLISH CENTRE.

Diploma.

JOYCE ALLISON, Midland Agricultural College, Sutton Bonington.

DIANA MARY BATES, Studley College, Warwickshire.

WENDY BEATRICE BELFIELD, Midland Agricultural College, Sutton Bonington.

ROSEMARY BERRIDGE, Midland Agricultural College, Sutton Bonington.

JULIETTE BIDE, The University and British Dairy Institute, Reading.

GEORGE WILLIAM BIRCHENOUGH, Midland Agricultural College, Sutton Bonington.

VERONICA BONDI, Studley College, Warwickshire.

ELIZABETH AUDREY BROAD, Seale Hayne Agricultural College, Newton Abbot.

GILLIAN MARY COOK, The University and British Dairy Institute, Reading.

ELONWY ANN DAVID, University College of Wales, Aberystwyth.

ELUNED POWYS DAVIES, University College of Wales, Aberystwyth.

JENNIE DAVIES, University College of Wales, Aberystwyth.

PAMELA EVELYN DOWLEN, Studley College, Warwickshire.

VERA LAWRY EDDY, Midland Agricultural College, Sutton Bonington.

MILLCENT ALICE EDWARDS, Seale Hayne Agricultural College, Newton Abbot.

BETTY MAY EVANS, Studley College, Warwickshire.

MARGARET EILEEN FALKNER, Midland Agricultural College, Sutton Bonington.

KATHLEEN MARY FISHER, Midland Agricultural College, Sutton Bonington.

KENNETH LANCELOT GODDARD, Seale Hayne Agricultural College, Newton Abbot.

LETITIA MARY ALDWYTH GRIFFITHS, University College of Wales, Aberystwyth.

JUNE ANNETTE GROVER, Studley College, Warwickshire.

MARY OLIVE GWYTHYR, The University and British Dairy Institute, Reading.

JANETTE HADLEY, The University and British Dairy Institute, Reading.

MALCOLM HORACE HAGUE, Midland Agricultural College, Sutton Bonington.

LESLIE STEPHEN HARRIS, University College of Wales, Aberystwyth.

MARGARET HELEN HEWETT, The University and British Dairy Institute, Reading.

BETTY HILL, Midland Agricultural College, Sutton Bonington.

JOHN CHARLES HOCKEN, Seale Hayne Agricultural College, Newton Abbot.

KATHLEEN VALERIE JAKES, The University and British Dairy Institute, Reading.

PATRICIA ISABEL JEWELL, The University and British Dairy Institute, Reading.

GWYNETH MAY JONES, University College of Wales, Aberystwyth.

VIVIEN BONIWELL LAIDLAW, The University and British Dairy Institute, Reading.

- JEAN LAMBERT, Midland Agricultural College, Sutton Bonington.
HILDA R. LANG, The University and British Dairy Institute, Reading.
MARY PATIENCE LANG, The University and British Dairy Institute, Reading.
EMILY JEAN M'BRYDE, Midland Agricultural College, Sutton Bonington.
HONOR ISABEL MALINS, The University and British Dairy Institute, Reading.
EMMA MARY MEGGINSON, Studley College, Warwickshire.
PRISCILLA MARY MELLIS, The University and British Dairy Institute, Reading.
AVERIL DOROTHY NOWELL, The University and British Dairy Institute, Reading.
PENELOPE ELIZABETH PIPON, The University and British Dairy Institute, Reading.
JANE ELINOR PUGH, University College of Wales, Aberystwyth.
ANN COURTENAY CAREW ROBINSON, Studley College, Warwickshire.
ELIZABETH MARY ROBSON, The University and British Dairy Institute, Reading.
JUNE SANDERS, University of Wales, Aberystwyth.
KATHLEEN JOYCE SKIDMORE, Studley College, Warwickshire.
ELISABETH MARY STUDD, The University and British Dairy Institute, Reading.
PATRICIA TERRY, The University and British Dairy Institute, Reading.
GLYTHYN MARJORIE SARAH THOMPSON, University College of Wales, Aberystwyth.
JEAN MARGARET TILLEY, University College of Wales, Aberystwyth.
HELEN DAPHNE TONGE, University College of Wales, Aberystwyth.
JANET PATRICIA WEBBER, The University and British Dairy Institute, Reading.
DILYS RHYS WILLIAMS, University College of Wales, Aberystwyth.
EVANGELINE JOAN WILLIAMS, The University and British Dairy Institute, Reading.
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EXAMINATION PAPERS OF PAST YEARS.

Copies of papers set at past Examinations in DAIRYING may be had on application. Price 1/- per set. Papers available are those for the years 1939, 1940, 1942, 1944, and 1945.

CERTIFICATES IN FORESTRY

In 1870 the Society instituted an Examination in Forestry, and granted First and Second-Class Certificates respectively to such students as attained a certain standard of proficiency in the following subjects. Candidates were required to possess a thorough acquaintance with the theory and practice of Forestry, and a general knowledge of the following branches of study, so far as these applied to Forestry: (a) the elements of Forest Botany and Forest Zoology; (b) the elements of Meteorology and Geology; (c) Forest Engineering; and (d) Arithmetic and Book-keeping.

Holders of the First-Class Certificate were entitled to become free Life Members of the Society.

In view of the institution of Examinations for Certificates and Diplomas in Forestry by the Royal Scottish Forestry Society, and by arrangement with that Society, the Board of Directors of the Highland and Agricultural Society of Scotland resolved in 1935 to cease holding further Examinations for the First and Second-Class Certificates, and that, in future, the granting of Certificates and Diplomas be left in the hands of the Royal Scottish Forestry Society.

The list of students who obtained the Highland and Agricultural Society's Certificates in Forestry prior to 1899 appears in the 'Transactions' for the year 1899. A further list of those obtaining Certificates between 1899 and 1935 inclusive appears in the 'Transactions' for the year 1935. The total number of Certificates granted since the commencement of the Examination in 1870 was as follows: First-Class, 43; Second-Class, 38.

VETERINARY CERTIFICATES AND MEDALS

The Society established a Veterinary Department in 1823, but by an arrangement made with the Royal College of Veterinary Surgeons, the Society's examination ceased in 1881. Holders of the Society's Veterinary Certificate are entitled to become members of the Royal College of Veterinary Surgeons on payment of certain fees, without being required to undergo any further examination. The number of students who passed for the Society's Certificate is 1183.

The Society gives annually a limited number of silver medals for Class competition to each of the two Veterinary Colleges in Scotland—the Royal (Dick) Veterinary College, Edinburgh, and the Glasgow Veterinary College, Glasgow.

CHEMICAL DEPARTMENT

PRICES OF FERTILISERS AND FEEDING-STUFFS— SEASON 1946.

(Cash Prices as at 6th February. These prices are subject to variation from month to month or oftener.)

FERTILISERS.

Name of Fertiliser.	Guarantee.	Price per Ton.	Price per Unit.
		£ s. d.	s. d.
Superphosphate *	18% Sol. Phos. Acid	5 8 6	6 0½
" (March-June)	"	5 10 0	6 1½
Sulphate of Ammonia (neutral) *	20·6% Nitrogen	10 0 6	9 8½
" (March-June)	"	10 2 0	9 9½
Basic Slag *†	12% Total Phos. Acid	2 12 6	4 4½
" " *†	13% Total Phos. Acid	2 15 6	4 3½
" " *†	14% Total Phos. Acid	2 18 6	4 2½
" " *† (Bessemer).	18·3% Total Phos. Acid.	3 11 6	3 11
North African Ground Mineral Phosphate *†	26% Total Phos. Acid	5 3 0	3 11½
Bone Meal (Indian)	4% Nitrogen	20 0 0	{ N 44 5½ TPA 11 1½
Chilean Nitrate of Soda *	20% Total Phos. Acid		
Chilean Potash Nitrate *	16% Nitrogen	10 14 0	13 4½
Nitro Chalk *	15% Potash	15 15 0	{ N 14 0 P 7 0
Sulphate of Potash	15·5% Nitrogen		
Muriate of Potash	48·5% Potash	9 14 0	12 6½
	60% "	18 15 0	7 8½
		13 13 0	4 6½

The prices for all fertilisers are cash prices for two-ton lots in bags at Leith or Glasgow, unless otherwise stated. Where prices are quoted carriage paid, there is a reduction, in certain cases, of from 5/- to 10/- per ton when lifted Ex Sellers' stores.

* Carriage paid to any railway station in six-ton lots. Four-ton lots 2/6 more per ton.

† The fineness is such that 80% of the powder will pass through the prescribed sieve.

‡ The fineness is such that 90% of the powder will pass through the prescribed sieve. 85% solubility in citric acid.

N.B.—When these units are multiplied by the percentages in the analysis of a Manure, they will produce a value representing very nearly the cash price per ton at which Fertilisers may be bought in fine sowing condition at Leith.

Shell Lime (90% calcium oxide), at Greenleighton, 36/5 per ton; (70% calcium oxide), at Loanhead (Shotts), 41/9 per ton; at Esperston, Gorebridge, 39/- per ton; at Middleton, Gorebridge, 40/5 per ton.

Ground Lime, in bags (60% calcium oxide), at Dufftown, 57/8 per ton; (60% calcium oxide), at Loanhead (Shotts), 59/3 per ton; (70% calcium oxide), at Middleton, Gorebridge, 58/6 per ton.

English Ground Lime (85% calcium oxide), at Greenleighton, 52/11 per ton.

Ground Limestone (94% calcium carbonate), at Loanhead (Shotts), 29/- per ton; (90% calcium carbonate), at Grange, 24/6 per ton; (90% calcium carbonate), at Middleton, Gorebridge, 23/- per ton; (96% calcium oxide), at Blencow, f.o.r., 26/6 per ton.

FEEDING-STUFFS.

Name of Feeding-Stuff.	Price per Ton.
Linseed Cake (Home), 8% Oil, 28% Albuminoids	£ s. d. 11 5 0
" (Expeller), 9% Oil, 30% Albuminoids *	11 7 6
Cotton Seed Cake (Egyptian) (undecorticated) (home made), 4.5% Oil, 22% Albuminoids	7 17 6
Decorticated Cotton Seed Cake, 48-50% Oil and Albuminoids *	10 2 6
Ground Nut Cake—	
Decorticated, 48-50% Oil and Albuminoids	9 10 0
" (Expeller), 57-60% Oil and Albuminoids *	9 17 6
Palm Kernel Cake	8 5 0
Rice Bran Meal *	8 5 0
White Bran, straight run	9 17 6
Red Bran, straight run	8 17 6
Dried Grains †	{ From 7 7 6 To 8 17 6
Locust Beans (Kibbled) *†	9 12 6
Maize †	10 0 0
" (Flaked) †	{ From 12 2 6 To 12 6 0
Home Oats (Feeding)	16 0 0
White Fish Meal, 4% Oil, 64% Albuminoids (at Aberdeen)	23 14 8

All the above are controlled prices and are for one-ton lots direct ex import quay or mill, unless otherwise stated.

* None available at this date.

† Including Bags.

‡ Bags extra.

CLASSIFICATION OF MANURES.

BONE MEALS	{ Genuine Bone Meal contains about 20 per cent Phosphoric Acid equal to 43.7 per cent Tricalcium Phosphate, and about 4 per cent Nitrogen. If Phosphates are low, Nitrogen will be high, and conversely.
MIXTURES AND COMPOUND MANURES	{ To be valued according to the following units: Nitrogen, 9/10; Soluble Phosphoric Acid, 5/9½; Insoluble Phosphoric Acid, 3/5; and Potash, 4/11 (from muriate). The value so arrived at will be the value at Leith, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 30/- per ton.

INSTRUCTIONS FOR VALUING MANURES.

The unit used for the valuation of manures is the hundredth part of a ton, and as the results of analyses of manures are expressed in parts per hundred, the percentage of any ingredient of a manure when multiplied by the price of the unit of that ingredient represents the value of the quantity of it contained in a ton.

As an example take muriate of potash; a good sample (see p. 40) will be guaranteed to contain 60 per cent of oxide of potash. All potash manures are valued according to the amount of potash (oxide of potash) they yield, and muriate of potash yields 60 per cent of potash (K_2O)—i.e., 60 units per ton; and as a ton of muriate of potash costs £13, 13s., the price of the unit is the sixtieth part of that—viz., $4/6\frac{1}{2}$. If on analysis a sample of muriate of potash guaranteed to contain 60 per cent of potash is found to contain only 56 per cent, the price per ton will be $18/2$ (four times $4/6\frac{1}{2}$) less—viz., £12, 14s. 10d.

Similarly with all other manures, the price per unit is derived from the price per ton of a sample of good material up to its guarantee, and

therefore the proper price per ton of a manure is found by multiplying the price of the unit of the valuable ingredient by the percentage as found by analysis. If a manure contains more than one valuable ingredient, the unit value of each ingredient is multiplied by its percentage, and the values so found when added together give approximately the price per ton of the manure.

The commercial values of manures are determined by means of the UNITS in the following manner :—

Take the results of analysis of the manure, and look for the following substances :—

Phosphates dissolved (or soluble phosphoric acid)	} No other items but these are to be valued.
Phosphates undissolved (or insoluble phosphoric acid)	
Total phosphoric acid	
Nitrogen	
Potash	

Should the results of analysis or the guarantee not be expressed in that way, the chemist or the seller should be asked to state the quantities in these terms.

Suppose the manure is a superphosphate. The February price per unit of phosphoric acid in superphosphate (18 per cent grade) is $6/0\frac{1}{4}$, and if a consignment contains 17 per cent soluble phosphoric acid it is valued thus—

Soluble phosphoric acid. 17 times $6/0\frac{1}{4}$, equal to £5, 2s. 4d.

Insoluble phosphoric acid is not valued in a superphosphate.

Suppose the manure is a compound fertiliser containing 6 per cent nitrogen, 8 per cent soluble phosphoric acid, 1 per cent insoluble phosphoric acid, and 5 per cent potash. From the units given on p. 41 for "Mixtures and Compound Manures," the value of this compound fertiliser is obtained as follows :—

The value of the—

Nitrogen will be	£2 19 0 per ton
Soluble phosphoric acid will be	2 6 4 „
Insoluble phosphoric acid will be	0 3 5 „
Potash will be	1 4 7 „
	<hr/>
	£6 13 4

The value of this manure will thus be £6, 13s. 4d. per ton, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 30/- per ton. It will be seen that the potash is valued on the assumption that it is derived from muriate.

Note.—The units have reference solely to the MARKET PRICES of MANURES, and not to their AGRICULTURAL VALUES.

TABLE OF COMPENSATION VALUES FOR 1946.

TABLE SHOWING THE VALUE OF FEEDING-STUFFS AS MANURE PER TON, AND THE COMPENSATION VALUE PER TON OF FOOD CONSUMED, BASED ON THE AVERAGE UNIT PRICES OF FERTILISERS FOR 1946.

The following is a Table showing (under Section A) the average proportions of nitrogen, phosphoric acid, and potash present in the feeding-stuffs named. The Table also shows the value per unit of nitrogen, phosphoric acid, and potash, the prices per unit being the value per unit for compound manures prevailing for 1946. Under Section B of the Table is shown the compensation value per ton of food consumed for each of the feeding-stuffs named, based on the unit prices for 1946. Column (1) of Section B of the Table shows the value per ton recovered in dung; while the remaining two columns show the residual values per ton after one crop and two crops have been removed.

The residual value, after one crop has been removed, is taken as one-half of the original residual value. Residual values, after one crop has been removed, are reduced by one-half after each crop.

Foods.	Nitrogen.		
	Per cent in food.	Value at 9s. 10d. per unit.	Two-fifths value to manure.
	(1)	(2)	(3)
Cotton-cake, decorticated	6.90	s. d. 67 10	s. d. 27 2
Cotton-cake, undecorticated	3.54	34 10	13 11
Linseed-cake	4.75	46 9	18 8
Linseed	3.60	35 5	14 2
Soya-bean cake	6.85	67 4	26 11
Palm-nut cake	2.50	24 7	9 10
Cocoa-nut cake	3.40	33 5	13 4
Earth-nut cake	7.62	74 11	30 0
Rape cake	4.90	48 2	19 3
Beans	4.00	39 4	15 9
Peas	3.60	35 5	14 2
Wheat	1.80	17 8	7 1
Barley	1.65	16 3	6 6
Oats	2.00	19 8	7 10
Maize	1.70	16 9	6 8
Rice-meal	1.90	18 8	7 6
Locust beans	1.20	11 10	4 9
Malt	1.70	16 9	6 8
Malt culms	3.90	38 4	15 4
Bran	2.50	24 7	9 10
Brewers' and distillers' grains (dried)	3.30	32 5	13 0
Brewers' and distillers' grains (wet)	0.81	8 0	3 2
Dried distillery dreg	5.31	52 3	20 11
Clover hay	2.24	22 0	8 10
Meadow hay	1.50	14 9	5 11
Wheat straw	0.45	4 5	1 9
Barley straw	0.40	3 11	1 7
Oat straw	0.50	4 11	2 0
Mangolds	0.22	2 2	0 10
Swedes	0.25	2 6	1 0
Turnips	0.18	1 9	0 8
Fish-meal	8.98	88 4	35 4

The figures in column (10) are the

A. VALUE PER TON AS MANURE.						B. COMPENSATION VALUE PER TON OF FOOD CONSUMED.		
Phosphoric Acid.			Potash.			(1) Value re- covered in dung.	Residual Value after	
Per cent in food	Value at 5s. 9d. per unit.	Three- fourths value to manure.	Per cent in food.	Value at 4s. 11d. per unit.	Three- fourths value to manure.		(2) One crop.	(3) Two crops.
(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	s. d.	s. d.		s. d.	s. d.	s. d.	s. d.	s. d.
3.10	17 10	13 5	2.00	9 10	7 5	48 0	24 0	12 0
2.00	11 6	8 8	2.00	9 10	7 5	30 0	15 0	7 6
2.00	11 6	8 8	1.40	6 11	5 2	32 6	16 3	8 2
1.54	8 10	6 8	1.37	6 9	5 1	25 11	13 0	6 6
1.30	7 6	5 8	2.20	10 10	8 2	40 9	20 5	10 2
1.20	6 11	5 2	0.50	2 6	1 11	16 11	8 6	4 3
1.40	8 1	6 1	2.00	9 10	7 5	26 10	13 5	6 9
2.00	11 6	8 8	1.50	7 5	5 7	44 3	22 2	11 1
2.50	14 5	10 10	1.50	7 5	5 7	35 8	17 10	8 11
1.10	6 4	4 9	1.80	6 5	4 10	25 4	12 8	6 4
0.85	4 11	3 8	0.96	4 9	3 7	21 5	10 9	5 4
0.85	4 11	3 8	0.53	2 7	1 11	12 8	6 4	3 2
0.75	4 4	3 3	0.55	2 8	2 0	11 9	5 11	2 11
0.60	3 5	2 7	0.50	2 6	1 11	12 4	6 2	3 1
0.60	3 5	2 7	0.37	1 10	1 5	10 8	5 4	2 8
0.60	3 5	2 7	0.37	1 10	1 5	11 6	5 9	2 11
0.80	4 7	3 5	0.80	3 11	2 11	11 1	5 7	2 9
0.80	4 7	3 5	0.60	2 11	2 2	12 3	6 2	3 1
2.00	11 6	8 8	2.00	9 10	7 5	31 5	15 9	7 10
2.70	15 6	11 8	1.45	7 2	5 5	26 11	13 6	6 9
1.61	9 3	6 11	0.20	1 0	0 9	20 8	10 4	5 2
0.42	2 5	1 10	0.05	0 3	0 2	5 2	2 7	1 4
0.44	2 6	1 11	0.22	1 1	0 10	23 8	11 10	5 11
0.57	3 3	2 5	1.50	7 5	5 7	16 10	8 5	4 3
0.40	2 4	1 9	1.60	7 10	5 11	18 7	6 10	3 5
0.24	1 5	1 1	0.80	3 11	2 11	5 9	2 11	1 5
0.18	1 0	0 9	1.00	4 11	3 8	6 0	3 0	1 6
0.24	1 5	1 1	1.00	4 11	3 8	6 9	3 5	1 8
0.07	0 5	0 4	0.40	2 0	1 6	2 8	1 4	0 8
0.06	0 4	0 3	0.22	1 1	0 10	2 1	1 1	0 6
0.05	0 3	0 2	0.30	1 6	1 2	2 0	1 0	0 6
7.24	41 8	31 3	0.50	2 6	1 11	68 6	34 3	17 2

sum of columns (3), (6), and (9).

ENTOMOLOGICAL DEPARTMENT

Consulting Zoologist to the Society—A. E. CAMERON, M.A., D.Sc.,
Department of Agricultural and Forest Zoology, University of
Edinburgh, 10 George Square, Edinburgh.

REPORTS ON THE ANIMAL ENEMIES OF CROP PLANTS AND LIVE STOCK (INCLUDING POULTRY).

The Consulting Zoologist is prepared to send to any Member of the Society a Report on damage to, or diseases of, plants and animals due to animal agency (Insects, Mites, Worms, Snails, Slugs, Birds, and the Smaller Mammals), and will advise Members regarding insects or allied animals which, in any stage of their development, infest—

- | | |
|-----------------------------------|-------------------------------------|
| (a) Farm crops. | (d) Fruit and fruit trees. |
| (b) Stored grain and foodstuffs. | (e) Forest trees and stored timber. |
| (c) Garden and greenhouse plants. | (f) Live stock (including poultry). |

Any Member consulting Dr Cameron should give him full particulars of the damage or disease upon which his advice is desired. In addition, there should be sent to him specimens of the injured plants, or the injured parts of plants, &c., as well as specimens of the insects or animals believed to be the cause of the injury.

Specimens should be sent in tin or wooden boxes, or in quills, in order to prevent injury in transmission.

The Directors have fixed the fee payable by Members to Dr Cameron at 2s. 6d. for each case upon which he is consulted: this fee should be sent to him along with the application for information.

Letters and parcels (carriage or postage paid) should be addressed to A. E. Cameron, Esq., M.A., D.Sc., Department of Agricultural and Forest Zoology, University of Edinburgh, 10 George Square, Edinburgh.

BOTANICAL DEPARTMENT

Consulting Botanist to the Society—(vacant).

The Society has fixed the following scale of charges for the examination of plants and seeds for the *bona fide* and individual use and information of members of the Society (not being seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination required, and to quote its number as appearing in the undernoted Scale of Charges. The charge for examination must be paid at the time of application, and the carriage or postage on all parcels must be prepaid.

Scale of Charges for Examinations.

1. A report on the purity, amount, and nature of foreign materials, and the germinating power of a sample of seed 1s.
2. Determination of the species of any weed or other plant, or of any vegetable parasite, with a report on its habits and the means for its extermination or prevention 1s.
3. Report on any disease affecting farm crops 1s.
4. Determination of the species of any natural grass or fodder plant, with a report on its habits and pasture or feeding value 1s.

The Consulting Botanist's Reports are furnished to enable members—purchasers of seeds and corn for agricultural or horticultural purposes—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes by seedsmen or otherwise.

Purchase of Seeds.

The purchaser should obtain from the vendor, by invoice or other writing, the proper designation of the seeds bought, with a guarantee of the percentage of purity and germination, and of its freedom from ergot, and in the case of clover, from the seeds of dodder or broomrape.

It is strongly recommended that the purchase of *prepared mixtures* of seeds should be avoided. The different seeds should be purchased separately and mixed by the farmer: mixtures cannot be tested for germination.

The Sampling of Seeds.

The utmost care should be taken to secure a fair and honest sample. This should be drawn from the bulk delivered to the purchaser, and not from the sample sent by the vendor.

When legal evidence is required, the sample should be taken from the bulk, and placed in a sealed bag in the presence of a witness. Care should be taken that the sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or bulk.

At least one ounce of grass and other small seeds should be sent, and two ounces of cereals and the larger seeds. When the bulk is obviously impure the sample should be at least double the amount specified. Grass seeds should be sent at least four weeks, and seeds of clover and cereals two weeks, before they are to be used.

The exact name under which the sample has been sold and purchased should accompany it.

Reporting the Results.

The Report will be made on a schedule in which the nature and amount of impurities will be stated, and the number of days each sample has been under test, with the percentage of the seeds which have germinated.

"Hard" clover seeds, though not germinating within the time stated, will be considered good seeds, and their percentage separately stated.

The impurities in the sample, including the chaff of the species tested, will be specified in the schedule, and only the percentage of the pure seed of that species will be reported upon; but the REAL VALUE of the sample will be stated. The Real Value is the combined percentages of purity and germination, and is obtained by multiplying these percentages and dividing by 100: thus in a sample of Meadow Fescue having 88 per cent purity and 95 per cent germination, 88 multiplied by 95 gives 8360, and this divided by 100 gives 83·6, the Real Value.

Selecting Specimens of Plants.

The whole plant should be taken up and the earth shaken from the roots. If possible the plants should be in flower or fruit. They must be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They must be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

NOTE.—Members are reminded that Seeds may now be tested at the Department of Agriculture for Scotland Seed-testing Station. Samples should be addressed to the Seed-testing Station, East Craigs, Corstorphine, Edinburgh.

PREMIUMS OFFERED

1946

GROUP I.—REPORTS.

GENERAL REGULATIONS.

1. It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the writers whose papers are published in the 'Transactions.'

2. All reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter, similarly marked, containing the name and address of the reporter—initials must not be used.

3. No sealed letter, unless belonging to a report found entitled to the Premium offered, or a portion of it, will be opened without the author's consent.

4. Reports for which a Premium, or a portion of a Premium, has been awarded, become the property of the Society, and cannot be published in whole or in part, or circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors if applied for within twelve months.

5. The Society is not bound to award the whole or any part of a Premium.

6. All reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded or accepted. Weights and measurements must be indicated by the imperial standards.

7. The Directors, before or after awarding a Premium, shall have power to require the writer of any report to verify the statements made in it.

8. The decisions of the Board of Directors are final and conclusive as to all matters relating to Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

9. The Directors will welcome papers from any Contributor on any suitable subject, whether included in the Premium List or not ; and if the topic and the treatment of it are both approved, the writer may be remunerated and his paper published.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

2. Approved Reports on other suitable subjects. To be lodged by 1st November in any year.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive Improvement—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Minor Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the Reporter's proprietorship.

2. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty

acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

3. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

4. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The Reports in competition for Nos. 2, 3, and 4 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of profitable character, and a rotation of crops must have been concluded before the date of the Report. *A detailed statement of the expenditure and return* and a certified measurement of the ground are requisite.

5. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the Pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise, without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten pounds. To be lodged by 1st November in any year.

6. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos. 5 and 6 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—HIGHLAND INDUSTRIES.

FOR APPROVED REPORTS.

1. The best mode of treating native Wool; cleaning, carding, dyeing, spinning, knitting, and weaving by hand in the Highlands and Islands of Scotland—Five Pounds. To be lodged by 1st November in any year.

SECTION 4.—MACHINERY.

FOR APPROVED REPORTS.

To be lodged by 1st November in any year.

SECTION 5.—FORESTRY.

FOR APPROVED REPORTS.

1. On Plantations of not less than eight years' standing formed on deep peat-bog—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The Premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

GROUP II.—DISTRICT GRANTS.

APPLICATIONS.

Forms of Application may be obtained from the Secretary, 8 Eglinton Crescent, Edinburgh 12, which should be completed and returned on or before **1st November 1946**, in respect of a Grant commencing in the following year.

RENEWAL OF GRANT.—Applications for **renewal** of a particular Grant will be entertained only after the lapse of a specified interval of years (as undernoted) from the termination of the previous Grant, without prejudice, however, to the competency of applying in such intermediate years for a Grant in any other class.

Class.	Interval.
1. Grants of £12 for Show Premiums for Horses, Cattle, Sheep, and Pigs	4 years.
2. Grants of £15 in respect of Stallions engaged for Agricultural purposes	3 years.
3. Grants of Silver Medals in aid of Premiums	2 years.
4. Special Grants	—
5. Grants of £10 to Federations of S.W.R.I. for Show or Exhibition Prizes	2 years.

CLASS 1.

LOCAL AGRICULTURAL SOCIETIES—GRANTS OF £12 FOR SHOW PREMIUMS FOR HORSES, CATTLE, SHEEP, AND PIGS.

REGULATIONS, 1946.

1. CLASS OF STOCK—LIMIT OF GRANTS, £340.—The Highland and Agricultural Society will make Grants to Local Societies for Prizes for *Breeding Animals* in any of the following classes of Stock, viz. :—

<i>Cattle.</i>	<i>Horses.</i>
Shorthorn.	Draught Horses.
Aberdeen-Angus.	Hunters.
Galloway.	Hackneys.
Belted Galloway.	Ponies.
Highland.	Shetland Ponies.
Ayrshire.	<i>Sheep.</i>
British Friesian.	Blackface.
Red Poll.	Cheviot.
Jersey.	Border-Leicester.
Shetland.	Half-Bred.
	Shropshire.
	Oxford Down.
	Suffolk.
	Wensleydale.
<i>Pigs.</i>	
Any Pure Breed.	

Cross-bred ¹ animals are not eligible. The Prizes must be confined to *Breeding Animals*; “bullocks,” “geldings,” “wethers,” and “hog pigs” are excluded.

¹ *Exceptions to this rule may, however, be authorised by the Board of Directors, on application. The Directors are prepared to consider applications from Local Societies which desire to use their Grants, or part thereof, as prizes for cross bred calves and one-year-old cross-bred cattle.*

2. All Competitions must be at the instance of a local Society. A Committee of Management shall be appointed, and either the Convener of the Committee or the Secretary of the Society **must be a Member of the Highland and Agricultural Society of Scotland.**

3. GRANT TO SOCIETY, £12.—The portion of the Grant to any one local Society shall not exceed the sum of £12 in any one year.

4. ALLOCATION OF GRANT.—The Grant from the Highland and Agricultural Society shall not be applied as a Grant in aid of the Premiums offered by the local Society, but must be offered in the form of separate Prizes for the animals chosen; **and the offer of the Prizes must be announced in the Premium List and Catalogue of the Show as "presented by the Highland and Agricultural Society of Scotland."**

5. CONTINUANCE OF GRANT—THREE YEARS.—The Money Grant shall continue for three alternate years, provided always that the local Society shall, in the two intermediate years, continue the Competition by offering Premiums for the same class of Stock as that selected in each previous year to compete for the Highland and Agricultural Society's Prizes.

If no Competition takes place for two consecutive years the Grant expires.

6. MEDALS IN INTERMEDIATE YEARS.—In the two intermediate years the Highland and Agricultural Society will place three Silver Medals at the disposal of each local Society, for the same classes of Stock as those for which the Money Premiums are offered, provided that not less than three lots are exhibited in the same class.

7. When it is agreed to hold the General Show of the Society in any one of the Show Divisions, no local Society may hold a Show within that Division in the **three months immediately preceding** the date of the General Show. **In the event of a Show being held, the entire Grant to the local Society will be cancelled.**

8. RULES OF COMPETITION. The Rules of Competition for the Premiums, the funds for which are derived from Grants of the Highland and Agricultural Society, shall be such as are generally enforced by the local Society in the case of Premiums offered from its own funds.

9. AREA AND PARISHES—FIVE PARISHES.—When making application for Grants from the Highland and Agricultural Society, the local Society must delineate the area and the number of parishes comprised in the district, and, *except in special cases*, no local Society shall be entitled to a Grant whose Show is not open to at least *five* parishes.

10. REPORTS.—Forms of Report will be furnished to the Secretaries of local Societies. Detailed Reports of the Competitions for the Society's Premiums must be given and the completed Reports, duly signed and certified, must be lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Show, and in no case later than **1st November**. These Reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. **The Grant will lapse if no Report is lodged by the due date.**

11. GRANTS—WHEN PAID.—The Grants made to local Societies will be paid in December after the Reports of the awards of the Prizes have been received and found to be in order and passed by

the Board of Directors, the Money Grants being paid to the Secretaries of the local Societies and the Medals sent direct to the winners. *The Secretary of the local Society must not on any condition whatever pay any Premium offered by the Highland and Agricultural Society until he has been informed that the awards are in order and has received the Grant from the Highland and Agricultural Society.*

12. RENEWAL OF GRANT.—No application for renewal of a Grant to a local Society will be entertained until after the expiry of *four years* from the termination of the last Grant.

13. DISPOSAL OF APPLICATIONS.—In disposing of applications for District Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those local Societies which have been longest off the list.

Grants in 1946.

5th and Final Year—GRANT OF £12.

1. BOTHWELL FARMERS' SOCIETY.

Convener —

Secretary — J. S. Paterson, Horotta, Jerviston Road, Motherwell.

Granted 1935. (Grants in abeyance 1939-45 —on account of the war.)

2. DALSERF FARMERS' SOCIETY.

Convener —

Secretary —William W. Bulloch, 45a Union Street, Larkhall, Lanarkshire.

Granted 1936. (Grants in abeyance 1940-45 —on account of the war.)

3. ECHT, SKENE, AND MIDMAR AGRICULTURAL ASSOCIATION.

Convener—D. D. Laurie, Estates Office, Dunceath, Aberdeen.

Secretary —A. F. Robertson, Bank House, Echt, Aberdeen.

Granted 1937. (Grants in abeyance 1940-44 —on account of the war.)

4. ISLAY, JURA, AND COLONSAY AGRICULTURAL ASSOCIATION.

Convener—Dr Campbell M. McIntyre, "Ceann Loch," Bridge-end, Islay.

Secretary—Iain M. MacTaggart, Royal Bank of Scotland Buildings, Bowmore, Islay.

Granted 1936. (Grants in abeyance 1940-45—on account of the war.)

4th (Intermediate) Year—3 SILVER MEDALS.

5. EASTERN DISTRICT OF STIRLINGSHIRE AGRICULTURAL ASSOCIATION.

Convener—William Morton, Bensfield, Falkirk.

Secretary —Robert Waugh, Auction Mart, Falkirk.

Granted 1935. (Grant in abeyance 1937—on account of Alloa Show; in 1938—no Show held; in 1940-45—on account of the war.)

6. GLENKENS AGRICULTURAL SOCIETY.

Convener—Sir Andrew Agnew, C.B.E., Glenlee Park, New Galloway, Castle Douglas.

Secretary—Andrew Robb, Mains of Kenmure, New Galloway, Castle Douglas.

Granted 1936. (Grants in abeyance 1939-45—on account of the war.)

7. KILLEARN AGRICULTURAL SOCIETY.

Convener—John McQueen, Laigh Finnich Farm, Killearn.

Secretary—A. D. S. Macadam, Drumtian, Balfron Station.

Granted 1937. (Grants in abeyance 1940-45—on account of the war.)

8. KILMACOLM AND PORT-GLASGOW AGRICULTURAL SOCIETY.

Convener—Nigel Laird, Torridon, Kilmacolm.

Secretary—James Ferguson, Royal Bank of Scotland, Kilmacolm.

Granted 1937. (Grants in abeyance 1940-45—on account of the war.)

9. STRATHENDRICK AGRICULTURAL SOCIETY.

Convener—J. M. Bannerman, Old Manse, Balmaha, Loch Lomondside.

Secretary—A. H. Jessiman, Waverley, Balfron, Stirlingshire.

Granted 1936. (Grant in abeyance 1937—on account of Alloa Show ; in 1940-45—on account of the war.)

10. YARROW AND ETTRICK PASTORAL SOCIETY.

Convener—Thomas Usher of Hyndhope, Ettrick, Selkirk.

Secretary—George Brunton, Harehead, Selkirk.

Granted 1936. (Grants in abeyance 1939-45—on account of the war.)

3rd (Alternate) Year—GRANT OF £12.

11. BLACK ISLE FARMERS' SOCIETY.

Convener—John D. Maciver, Kilcoy Mains, Killoarnan, Ross-shire.

Secretary—Robert Strachan, M.A., The Schoolhouse, Avoch, Ross-shire.

Granted 1937. (Grant in abeyance 1938 ; in 1940-45—on account of the war.)

12. CUMBERNAULD AGRICULTURAL SOCIETY.

Convener—Walter Duncan, Wester Dullatur, Dullatur, Dumbartonshire.

Secretary—A. Elrick Gray, Cumbernauld Estate Office, Dullatur, Dumbartonshire.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

13. DENNY AND DUNIPACE AGRICULTURAL ASSOCIATION.

Convener—William Muirhead, Foot o' Green, Bannockburn, by Stirling.

Secretary—Major A. Forbes Hendry, M.C., LL.B., 30 Glasgow Road, Denny.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

14. FORMARTINE AGRICULTURAL ASSOCIATION.

Convener—E. B. Lee, Bullroad, Tarves, Aberdeenshire.

Secretaries—Alfred Marr and David S. Minto, Cultercullen, Udney Station, Aberdeenshire.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

15. NEILSTON AGRICULTURAL SOCIETY.

Convener—

Secretary—John M. Morton, The Clydesdale Bank Ltd., Neilston.

Granted 1939. (Grants in abeyance 1941-45—on account of the war.)

16. SKYE AGRICULTURAL SOCIETY.

Convener—

Secretary—S. Lindsay Hamilton, D.O.A.S., Estates Office, Portree, Isle of Skye.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

17. STONEHOUSE AGRICULTURAL SOCIETY.

Convener—William Wilson, Udston Farm, Stonehouse, Lanarkshire.

Treasurer—Archibald Macfie, Union Bank, Stonehouse, Lanarkshire.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

18. STRATHBOGIE FARMER CLUB.

Convener—Alexander Dufton, Corse of Kinnoir, Huntly.

Joint Secretaries—James Ogilvie and A. S. Wilson, Commercial Bank Buildings, Huntly.

Granted 1938. (Grants in abeyance 1940-45—on account of the war.)

19. WEST LOTHIAN AGRICULTURAL SOCIETY.

Convener—Archibald Wood, Carlowrie, Kirkliston.

Secretary—James T. Kidd, W.S., 8 High Street, Linlithgow.

Granted (to Bathgate Agricultural Association) 1938. (Grants in abeyance 1940-45—on account of the war.)

2nd (Intermediate) Year—3 SILVER MEDALS.**20. CARNWATH AGRICULTURAL SOCIETY.**

Convener—John Struthers, Anston, Dunsyre, Lanark.

Secretary—John N. Lennox, Commercial Bank Office, Carnwath, Lanarkshire.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

21. CROMAR, UPPER DEF, AND DONSIDER AGRICULTURAL SOCIETY.

Convener—Lieut.-Colonel William Lilburn of Coull, Aboyne, Aberdeenshire.

Secretary—J. T. Taylor, Bank House, Tarland, Aberdeenshire.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

22. DUNBARTONSHIRE AGRICULTURAL SOCIETY.

Convener—James R. Lumsden of Arden, Dumbartonshire.

Secretary—George M. Charleson, Commercial Bank of Scotland Ltd., Alexandria, Dumbartonshire.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

23. KENNETHMONT AGRICULTURAL ASSOCIATION.

Convener—Alexander Anderson, Percylieu, Clatt, Kennethmont, Aberdeenshire.

Secretary—William Henderson, Ardmore Villa, Kennethmont.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

24. LOCKERBIE AGRICULTURAL SOCIETY.

Convener—Captain Joseph Steel of Kirkwood, Lockerbie.

Secretaries—Henderson & Mackay, Solicitors, Lockorbie.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

25. MID-ARGYLL AGRICULTURAL SOCIETY.

Convener—Neil M'Neill, Dunamuck Farm, Kilmichael Glassary, by Lochgilhead, Argyll.

Secretary—Major J. G. Mathieson, Kilmartin, by Lochgilhead, Argyll.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

26. STEWARTRY AGRICULTURAL SHOW.

Promoted by the St Mary's Isle Agricultural Society, the Dalbeattie Agricultural Society, and the Gatehouse District Agricultural Society.

Secretary—R. Ian Hewat, B.L., Union Bank Buildings, Castle Douglas.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

27. STIRLING AGRICULTURAL SOCIETY.

Convener—

Secretary—William Thomson, Estates Office, Polmaise, Stirling.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

28. STRATHSPEY FARMERS' CLUB.

Convener—James Gordon, Lower Dolielfuro, Grantown-on-Spey.

Secretary—Thomas Gordon, M.A., LL.B., Town Clerk's Office, Grantown-on-Spey.

Granted 1938. (Grant in abeyance 1938 ; in 1940-45—on account of the war.)

29. UPPER DEESIDE AGRICULTURAL ASSOCIATION.

Convener—

Secretary—William Komp, Bank House, Torphins, Aberdeenshire.

Granted 1939. (Grants in abeyance 1940-45—on account of the war.)

1st Year—GRANT OF £12.

30. BUCHAN AGRICULTURAL SOCIETY.

Convener—Douglas J. Fowlio, Millhill, Longside, Aberdeenshire.

Secretary—Robert Scott, Solicitor, Town House, Frasersburgh.
Granted 1946.

31. BUTE AGRICULTURAL SOCIETY.

Convener—William Hunter, Upper Ettrick Farm, North Bute.

Secretary—J. M. Mathieson, County Buildings, Rothesay.
Granted 1946.

32. CARLUKE AGRICULTURAL SOCIETY.

Convener—T. C. Bell, Stravenhouse, Carluko.

Secretary—J. T. Hepburn, Yieldshields Farm, Yieldshields, Carluko.

Granted 1940. (Grants in abeyance 1940-45—on account of the war.)

33. EAST OF FIFE AGRICULTURAL SOCIETY.

Convener—John Bell, jun., Ochter House, Elie, Fife.

Secretary—Donald MacCulloch, National Bank of Scotland Ltd., Elie, Fife.

Granted 1946.

34. FETTERCAIRN FARMERS' CLUB.

Convener—John Grant, West Ballochry, Montrose.

Secretary—W. D. Johnston, Southesk Granaries, Montrose.
Granted 1946.

35. **KILFINICHEN AND KILVICKEON AGRICULTURAL SOCIETY.**
Convener—Donald Macdonald, Sheepknowe, Bunessan, Oban.
Secretary—William R. MacDougall, Uisgean, Bunessan, Oban.
Granted 1946.
36. **KINCARDINESHIRE FARMERS' CLUB.**
Convener—Alfred E. Argo, Cheyne Farm, Stonehaven.
Secretary—James B. Connon, Solicitor, Stonehaven.
Granted 1946.
37. **LESLIE AND DISTRICT AGRICULTURAL SOCIETY.**
Convener—Richard A. Lathangie, Ballingall Mill, Leslie.
Secretary—James S. Hardie, 22 Paterson Park, Leslie, Fife.
Granted 1946.
38. **LORN AGRICULTURAL SOCIETY.**
Convener—John MacMillan, Ferlochan, Benderloch, Connel, Argyll.
Secretary—J. C. Bell, National Bank Buildings, Oban.
Granted 1939. (Grants in abeyance 1939-45—on account of the war.)
39. **UNITED EAST LOTHIAN AGRICULTURAL SOCIETY.**
Convener—A. G. Spence, Lempockwells, Pencaitland.
Secretaries—Stirling & Burnet, Solicitors, Haddington.
Granted 1940. (Grants in abeyance 1940-45—on account of the war.)
40. **UPPER DONSIDE AGRICULTURAL SOCIETY.**
Convener—William Ellis, Cairncoullie, Cushnie, Aberdeenshire.
Secretary—John Strachan, Milton, Glenkindie, Aberdeenshire.
Granted 1946.
41. **WEST TEVIOTDALE AGRICULTURAL SOCIETY.**
Convener—James W. P. Amos, Northhouse, Hawick.
Joint Secretaries—W. R. Kirkpatrick and R. E. Grieve, Royal Bank Buildings, Hawick.
Granted 1946.
42. **WESTERN DISTRICT OF FIFE AGRICULTURAL SOCIETY.**
Convener—William Dick, Transy, Dunfermline.
Secretary—James G. Pollock, 17 Charles Street, Dunfermline.
Granted 1946.
43. **WESTERN DISTRICT OF MIDLOTHIAN AGRICULTURAL ASSOCIATION.**
Convener—
Secretary—Maxwell C. Dick, 125 Constitution Street, Leith.
Granted 1940. (Grants in abeyance 1940-45—on account of the war.)

CLASS 2.

HORSE ASSOCIATIONS — GRANTS OF £15 IN RESPECT OF STALLIONS ENGAGED FOR AGRICULTURAL PURPOSES.

REGULATIONS, 1946.

1. The Highland and Agricultural Society will make Grants to Horse Associations and other Societies in different districts engaging Stallions for agricultural purposes. The total sum expended by the Highland and Agricultural Society in such Grants shall not exceed the sum of £210 in any one year.

(*Note.*—As a special provision this sum has been raised to £300 for the year 1946.)

2. All applications must be at the instance of a Horse Association. Either the Convener or the Secretary must be a member of the Highland and Agricultural Society of Scotland.

3. *Application of Grant.*—The portion of the Grant to any one Association or Society shall not exceed the sum of £15 in any one year. It is intended that the Grant shall be used by the Association or Society for the purpose of enabling it to secure a better class of Stallion.

4. *Duration of Grant.*—The Grant will continue for three consecutive years.

5. *Registration of Stallions.*—The Grants will be available only for Stallions which, for the years to which the Grants apply, are registered in the Register of Certified Draught Stallions published by the Department of Agriculture for Scotland. (For information regarding the Registration of Stallions, apply to the Secretary of the Department of Agriculture for Scotland, St Andrew's House, Edinburgh.)

6. *Engagement of Stallions.*—In the event of a Horse not being engaged in any one year while the provisions of the Grant are in force, the Grant made by the Highland and Agricultural Society will cease.

7. *Report to be Submitted.*—Forms of Report will be furnished to the Secretaries. Full details, as required, must be given and the completed Reports, duly signed and certified, must be lodged with the Secretary of the Highland and Agricultural Society as soon as possible, and in no case later than 1st November. These Reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. The Grant will lapse if no Report is lodged by the due date.

8. *Payment of Grant.*—Grants will be paid in December after the Reports have been received and found to be in order and passed by the Board of Directors.

9. *Renewal of Grant.*—An Association or Society which has received a Grant shall not be eligible to apply for a renewal of the Grant until after the expiry of three years from the termination of the previous Grant. In disposing of applications the Directors of the Highland and Agricultural Society of Scotland shall keep in view the length of interval that has elapsed since making a previous Grant, giving priority to those Associations or Societies which have been longest without a Grant.

Grants in 1946.

3rd and Final Year—GRANT OF £15.

1. ROSS OF MULL HEAVY HORSE-BREEDING SOCIETY.

Convener—Donald Macdonald, Sheepknowe, Bunessan, Isle of Mull.

Secretary—W. R. MacDougall, Uisgoan, Bunessan, Isle of Mull.

Granted 1943. (In abeyance 1945.)

2. SCOTTISH CENTRAL HORSE-BREEDING ASSOCIATION.

Convener—John Stirling, Letham, Aberdour, Fife.

Secretary—Mrs M'Lay, Dunvegan, Causewayhead, Stirling.

Granted 1944.

2nd Year—GRANT OF £15.

3. CAITHNESS CLYDESDALE HORSE-BREEDING SOCIETY.

Convener—Donald Harrold, Lower Reiss, Wick.

Secretary—John Gowans, Janetstown, Wick.

Granted 1945.

4. CARSE AND DUNDEE DISTRICT STALLION SOCIETY.

Convener—W. L. Thoms, Midway, Longforgan.

Secretary—Joseph Murray, Balruddery Farm, Invergowrie.

Granted 1945.

5. DALKEITH AGRICULTURAL SOCIETY.

Convener—R. H. Watherston, Crichton Mains, Ford, Midlothian.

Secretary—D. W. Webster, 5 Clifton Terrace, Edinburgh 12.

Granted 1945.

6. KINROSS-SHIRE AGRICULTURAL SOCIETY.

Convener—James Paton, Kirkness, Glencraig.

Secretary—John F. Watson, M.R.C.V.S., Ardmoir, Stirling Road, Milnathort.

Granted 1945.

7. NAIRNSHIRE FARMING SOCIETY.

Convener—Brigadier J. E. Stirling, D.S.O., Holme Rose, Croy, Gollanfield.

Secretary—G. Innes, Ashiestiel, Nairn.

Granted 1945.

8. SOUTH DEESIDE STOCK IMPROVEMENT SOCIETY.

Convener—James Blackhall, Upper Balfour, Durris, Drumoak.
Secretary—John Duncan, Hall Cottage, Kirkton, Durris, Drumoak.

Granted 1945.

3rd Year—GRANT OF £15.

9. FIFE AGRICULTURAL SOCIETY.

Convener—Hugh L. Stewart, Struthers Farm, Ceres, Fife.
Secretary—T. Landale Rollo, LL.B., Solicitor, Cupar, Fife.

Granted 1946.

10. MORAY STOCK IMPROVEMENT SOCIETY.

Convener—James Royan, New Alves, by Elgin.
Secretary—Colonel W. Rose Black, Solicitor, Elgin.

Granted 1946.

11. SELKIRK AND GALASHIELS AGRICULTURAL SOCIETY.

Convener—Matthew Templeton, Goshen Bank, Kelso.
Secretary—Alexander S. Hogg, Birkenside, Earlston, Berwickshire.

Granted 1946.

12. SHAPANSEY AGRICULTURAL ASSOCIATION.

Convener—William T. Wood, Balfour Mains, Shapansey, Orkney.
Secretary—D. L. Kemp, Bayview, Shapansey, Orkney.

Granted 1946.

13. STONEHAVEN DISTRICT HORSE-BREEDING ASSOCIATION.

Convener—James Beattie, Clayfolds, by Stonehaven.
Secretary—James B. Connon, Solicitor, Stonehaven.

Granted 1946.

14. UPPER DONSIDER AGRICULTURAL SOCIETY.

Convener—William Ellis, Cairncoullie, Cushnie, Aberdeenshire.
Secretary—John Strachan, Milton, Glenkindie, Aberdeenshire.

Granted 1946.

CLASS 3.

LOCAL AGRICULTURAL SOCIETIES—GRANTS OF SILVER MEDALS IN AID OF PREMIUMS.

REGULATIONS, 1946.

The Society, being anxious to co-operate with local Societies, will give a limited number of Silver Medals annually to Societies (but not concurrently if also in receipt of a Grant under Class 1), in addition to the Money Premiums offered by them, for—

1. Best Bull, Cow, or Heifer of any pure breed specified in Class 1.
2. Best Stallion or Mare of any pure breed specified in Class 1.

3. Best Tup or Pen of Ewes of any pure breed specified in Class 1.
4. Best Boar, Sow, or Breeding Pig of any pure breed.
5. Best Pens of Poultry.
6. Best Sample of any variety of Wool.
7. Best Sample of any variety of Seeds.
8. Best-managed Farm.
9. Best-managed Green Crop.
10. Best-managed Hay Crop.
11. Best-managed Dairy.
12. Best Sweet-Milk Cheese.
13. Best Cured Butter.
14. Best Fresh Butter.
15. Best Collection of Roots.
16. Best-kept Fences.
17. Best Sheep-Shearer.
18. Most expert Hedge-Cutter.
19. Most expert Labourer at Draining.
20. Best Maker of Oatcakes.

It is left to the local Society to choose out of the foregoing list the classes to which the Medals are to be allocated.

RULES OF COMPETITION.

1. All Competitions must be at the instance of a local Society.
2. The classes for which Medals are granted must be in accordance with the foregoing list. The local Committee shall select the classes, and specify them in the Report.
3. The offer of the Medals must be announced in the Premium List and Catalogue of the Show as "presented by the Highland and Agricultural Society of Scotland."
4. The Medals are granted for two years, and lapse if not awarded in those years.
5. No Society shall receive more than two Medals in any year.
6. A Committee of Management shall be appointed, and either the Convener of the Committee or the Secretary of the Society must be a member of the Highland and Agricultural Society of Scotland.
7. When it is agreed to hold the General Show of the Society in any one of the Show Divisions, no local Society may hold a Show within that Division in the three months immediately preceding the date of the General Show. In the event of a Show being held, the entire Grant will be cancelled.
8. The Money Premiums given in the District must be not less than £2 for each Medal offered.
9. The Medal for Sheep-Shearing shall always accompany the highest Money Premium.
10. There must not be fewer than three competitors in all the classes.
11. Regarding Reports and despatch of Medals, Rules 10 and 11, Class 1, will apply.
12. When a grant of Medals has expired, a Society can only apply again for Medals after the lapse of a period of two years.

Grants in 1946.

2nd Year.

1. MAUCHLINE HORTICULTURAL AND AGRICULTURAL SOCIETY.

Convener—James Campbell, Kenmore, Mauchline, Ayrshire.

Secretary—R. C. Baird, B.Sc., Ashgrove, Mauchline, Ayrshire.

Granted 1938. (2 Medals—Roots and Produce.) (Grants in abeyance 1939-45—on account of the war.)

2. SOUTH UIST AND BENBECULA CATTLE SHOW SOCIETY.

Convener—Mrs Andreae, Gregarry Lodge, Isle of South Uist.

Secretary—Donald Maclean, Griminish, Benbecula, Isle of South Uist.

Granted 1938. (2 Medals—Dairy Produce.) (Grant in abeyance 1938 ; in 1940-45—on account of the war.)

3. VALE OF ALFORD AGRICULTURAL ASSOCIATION.

Convener—Alexander Philip, Wester Fowlis, Leochel-Cushnie, Alford, Aberdeenshire.

Secretary—W. A. Lawson, jun., Scotsmill, Tullynessle, Alford, Aberdeenshire.

Granted 1939. (2 Medals—Stock.) (Grants in abeyance 1940-45—on account of the war.)

4. PEEBLESSHIRE AGRICULTURAL SOCIETY.

Convener—Major E. G. Thomson, M.C., D.L., of Callands, West Linton.

Joint Secretaries—Robert Robertson, 66 Tweedholm Avenue, Walkerburn, and James Stewart, Caberston, Walkerburn.

Granted 1939. (2 Medals—Stock.) (Grants in abeyance 1940-45—on account of the war.)

CLASS 4.

SPECIAL GRANTS—1946.

(1) ANNUAL.

1. BRITISH WOMEN'S AGRICULTURAL ASSOCIATION.

1 Minor Gold Medal and 1 Medium Silver Medal for Champion Buttermaking Competitions at the Scottish National Fat Stock Club Show, Edinburgh.

Hon. Secretary—Mrs D. G. More, 5 Kilbryde Crescent, Dunblane.

Granted 1908.

2. NORTHERN COUNTIES ARTS AND CRAFTS SOCIETY—£20.
Convener—Miss Mackintosh of Raigmore, Raigmore, Inverness.
Joint Secretaries—Mrs Mitford, Berryfield, Lentrane, Inverness, and Miss Ruth C. Mackintosh, Raigmore, Inverness.
 Granted 1922.
3. SCOTTISH NATIONAL UNION OF ALLOTMENT HOLDERS.
 £15 and 15 Medium Silver Medals to be offered as Prizes for best Allotments.
Secretary and Treasurer—William S. McWilliam, 48 Edgehill Road, Glasgow, W.1.
 Granted 1927.
4. SHETLAND FLOCK BOOK SOCIETY.
 £10, 10s. to be offered at Tingwall Show as Prizes for Shetland Sheep, judged according to the standard of the Flock Book Society.
Convener—John Sutherland, Bixter, Shetland.
Secretary—John S. Johnston, Brentham Place, Lerwick.
 Granted 1938, for the years 1938-1942 inclusive. (Grants in abeyance 1939-45—on account of the war.)

(2) IN ALTERNATE YEARS.—GRANTS IN 1946.

£3 to each Society, to be competed for at the Annual Shows.

5. ROUSAY AGRICULTURAL SOCIETY, ORKNEY.
Convener—David C. Moar, Saviskaill, Rousay, Orkney.
Secretary—Robert S. Mainland, Nearhouse, Rousay, Orkney.
 Granted 1903.
 6. SOUTH RONALDSHAY AND BURRAY AGRICULTURAL SOCIETY, ORKNEY.
Convener—David R. Duncan, "Flaws," South Parish, South Ronaldshay.
Secretary—Robert G. Slater, St Margaret's Hope, Orkney.
 Granted 1904.
 7. SHAPANSEY AGRICULTURAL ASSOCIATION, ORKNEY.
Convener—William T. Wood, Balfour Mains, Shapansay, Orkney.
Secretary—D. L. Kemp, Bayview, Shapansay, Orkney.
 Granted 1934.
- (3) IN ALTERNATE YEARS.—GRANTS OF £3 IN ABEYANCE, 1946.
8. ORKNEY AGRICULTURAL SOCIETY.
Convener—Charles Hourston, Beaquoy Farm, Dounby, Kirkwall, Orkney.
Secretary—Gordon Watt, Kirkwall, Orkney.
 Granted 1883.

9. **EAST MAINLAND AGRICULTURAL SOCIETY, ORKNEY.**
Convener—William G. Smith, Hall of Tankerness, Tankerness, Orkney.
Secretary—Alfred C. Tait, Quoykoa, Toab, Kirkwall.
 Granted 1898.
10. **WEST MAINLAND AGRICULTURAL SOCIETY, ORKNEY.**
Convener—Percy F. Wood, Aikerness, Evie, Kirkwall, Orkney.
Secretary—George Learmonth, Pow, Quoyloo, by Stromness, Orkney.
 Granted 1900.
11. **SANDAY AGRICULTURAL ASSOCIATION, ORKNEY.**
Convener—W. Cowper Ward, Scar House, Sanday, Orkney.
Secretary—John Thomson, Ortie, Sanday, Orkney.
 Granted 1902.
12. **YELL AGRICULTURAL SOCIETY, SHETLAND.**
Convener—T. R. Manson, Ladybank, West Sandwick, Lerwick.
Secretary—Robert Johnson, The Manse, West Sandwick, Lerwick.
 Granted 1931.

CLASS 5.

FEDERATIONS OF SCOTTISH WOMEN'S RURAL
INSTITUTES—GRANTS OF £10.

REGULATIONS, 1946.

1. The Highland and Agricultural Society of Scotland will provide annually a sum not exceeding £150 as special Grants to Federations of Scottish Women's Rural Institutes.

2. *Grant to Federation*, £10.—The amount of the Grant to any one Federation shall not exceed the sum of £10 per annum.

3. *Duration of Grant*.—The Grant will continue for two consecutive years.

4. *Disposal of Applications*.—In disposing of applications for Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those Federations which have been longest off the list.

5. *Eligibility to Apply*.—All applications must be at the instance of a properly constituted Federation of Institutes.

6. *Application of Grant*.—The Grant of £10 shall not be applied as a Grant-in-aid to the general funds of a Federation, but must be offered in the form of Prizes at any Show or Competition held under the auspices of the Federation.

7. *Announcement of Grant*.—The offer of Prizes must be announced in the Prize List or Catalogue of the Show or Competition as "presented by

the Highland and Agricultural Society of Scotland," or the amount of the Grant must be shown as a separate item of donation in the published statement of Accounts.

8. *Rules of Competition.*—The Rules of Competition for the Prizes, the funds for which are derived from Grants of the Highland and Agricultural Society of Scotland, shall be such as are generally enforced in the case of Prizes offered from the Federation's own funds.

9. *Report to be Submitted.*—Forms of Report will be furnished to the Secretaries of Federations, and these must be completed and returned to the Society as soon as possible after the Show or Competition and in no case later than **1st November**. These Reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. All Reports must be signed and certified as marked on the Form.

The Grant will lapse if no Report is lodged.

10. *Payment of Grant.*—Payment of the Grant will be made in December after the Reports of the Awards have been received and found to be in order and passed by the Board of Directors.

11. *Renewal of Grant.*—A Federation which has received a Grant for two consecutive years shall not be eligible to apply for a renewal of the Grant until after the expiry of two years from the termination of the previous Grant.

Grants in 1946.

2nd Year.

1. DUMFRIESSHIRE FEDERATION.

Convener—Mrs Graham, Mossknowe, Kirkpatrick-Fleming.

Secretary—Mrs Forrester, Kilness, Dumfries.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943, 1944, 1945.)

2. EAST LOTHIAN FEDERATION.

Convener—Mrs Hay, Belton, Dunbar.

Secretary—Mrs M'Kemmie, 2 Wemyss Place, Haddington.

Granted 1938. (Grants in abeyance 1938, 1940, 1941, 1942, 1943, 1944, 1945.)

3. MIDLOTHIAN FEDERATION.

Convener—Mrs Mercer, Southfield, Dalkeith.

Secretary—Miss N. Scott Muir, 10 Silverknowes Loan, Davidson's Mains, Edinburgh 4.

Granted 1940. (Grants in abeyance 1940, 1941, 1943, 1944, 1945.)

4. MULL, ISLE OF, FEDERATION.

Convener—Mrs Allan of Aros, Tobermory.

Secretary—Mrs Cuninghame, Linnthu, Tobermory.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943, 1944, 1945.)

5. ROSS-SHIRE FEDERATION.

Convener—Mrs Ross, East House, Portmahomack, Ross-shire.

Secretary—Miss Margaret Rose, Inchrorie, Strathpeffer.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943, 1944, 1945.)

1st Year.

6. BERWICKSHIRE FEDERATION.

Convener—Mrs Stevenson, Blackburn, Lauder.

Secretary—Miss A. M'B. Cowan, Roselea, Oxtou, Berwickshire.

Granted 1946.

7. DUNBARTONSHIRE FEDERATION.

Convener—Miss E. G. Murray, M.B.E., Moore Park, Cardross, Dumbartonshire.

Secretary—Mrs Dunlop, Albyn, Cardross, Dumbartonshire.

Granted 1946.

GROUP III.—COTTAGES AND GARDENS, &c.

The following Premiums are offered for Competition.
The Premiums are granted for two years.

CLASS 6.**LOCAL SOCIETIES, &c.—GRANTS FOR BEST-KEPT
COTTAGES AND GARDENS.**

1. Best-kept Cottage	£1 0 0
Second best	0 10 0
2. Best-kept Cottage Garden	1 0 0
Second best	0 10 0

Forms of application may be obtained from the Secretary, and should be completed and returned on or before 1st November next, in respect of a Grant commencing in the following year.

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Lodges at Gentlemen's Approach Gates and Gardeners' Houses are excluded, as well as others whom the Committee consider, from their position, not to be entitled to compete. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. It shall be left to the Committee in the District to fix two grades of Cottages, with maximum rents of £10 and £16 respectively, and to apply for Grants of £3 in respect of each.

4. To warrant the award of full Premiums, there must not be fewer than three Competitors in each class. If there are less than three Competitors in each class, only half Premium will be awarded.

5. A person who has gained the highest Premium cannot compete again.

6. If the Cottage is occupied by the proprietor, the roof must be in good repair; if the roof is thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly; the windows must be free of broken glass, clean, and affording the means of ventilation. Dung-hills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed

the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

7. In estimating the claims for the Garden Premiums, the judges should have in view—the sufficiency and neatness of the fences and walks: the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the Garden.

8. Reports, stating the number of Competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be lodged with the Secretary of the Highland and Agricultural Society *on or before 1st November next*.

9. When a grant of Money has expired, the District cannot apply again for aid for four years.

Grants in 1946.

1st Year.

1. BENBECULA HORTICULTURAL SOCIETY.

Convener—Mrs Paterson, Howmore House, Howmore, by Lochboisdale, South Uist.

Secretary—Douglas H. Kerr, Creagorry Hotel, Benbecula, South Uist.

Granted 1946.

CLASS 7.

LOCAL SOCIETIES, &c.—GRANTS OF MINOR SILVER MEDALS FOR BEST-KEPT COTTAGES AND GARDENS, GARDEN PRODUCE, POULTRY, AND HONEY.

RULES OF COMPETITION.

1. The Society will give annually one or two Minor Silver Medals to a limited number of local Associations or individuals, who establish Competitions and Premiums for Cottages, Gardens, Garden Produce, or Bee-Keeping. The Medals will be granted for two years.

2. The Medals may be offered in any two of the following sections, *but under no circumstances will the two Medals be given in one of the sections* :—

- (1) Best-kept Cottage or best-kept Cottage and Garden. (One Medal only.)
- (2) Best-kept Garden. (One Medal only.)
- (3) Best Collection of Garden Produce—Flowers excluded. (One Medal only.)
- (4) Best Pen of Poultry. (One Medal only.)
- (5) Honey. (One Medal only.)

3. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, must not exceed £20. The occupiers of

Lodges at Gentlemen's Approach Gates, and Gardeners in the employment of others, are not entitled to compete.

4. If Competition takes place for Garden Produce, such produce must be *bona fide* grown in the Exhibitor's Garden. He will not be allowed to make up a collection from any other Garden. The produce must consist of Vegetables, or Vegetables and Fruit (not Fruit alone). Flowers are excluded.

5. The Honey must be the produce of the Exhibitor's own Hives.

6. To warrant the award of a Medal, there must not be fewer than three Competitors.

7. Forms of Report of Competitions will be furnished to the Secretaries in the different Districts. These must, in all details, be completed and lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Competition, and, in no case later than *1st November*, for the approval of the Directors, against whose decisions there shall be no appeal.

8. If no Competition takes place in a District for two years the grant expires.

9. When a grant of Medals has expired, the District cannot apply again for a similar grant until after the lapse of a period of two years.

Grants in 1946.

1st Year.

1. BENBECULA HORTICULTURAL SOCIETY.

Convener—Mrs Paterson, Howmore House, Howmore, by Lochboisdale, South Uist.

Secretary—Douglas H. Kerr, Creagorry Hotel, Benbecula, South Uist.

Granted 1946. (2 Medals.)

GROUP IV.—PLOUGHING, HOEING, AND LONG FARM SERVICE.

1. MEDALS FOR PLOUGHING COMPETITIONS.

The Ploughing Medal will be given to the winner of the first Premium at Horse and Tractor Ploughing Competitions, provided Reports in the following terms on the official forms are made to the Secretary, within one month of the Competition, by a Member of the Society. Forms of Report to be had on application.

HORSE PLOUGHING.

FORM OF REPORT.

I, _____ of _____, Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the _____ Association at _____ in the county of _____ on the _____ when _____ Horse ploughs competed ; _____ of land were assigned to each, and _____ hours were allowed for the execution of the work. The sum of £ _____ was awarded as follows :—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All Matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All Reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can report only one Match ; and a Ploughman cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal, there must have been 12 Ploughs in actual competition for the Medal (*i.e., in the particular class for which the Medal was offered*) and not less than £3 awarded in Prizes by the local Society. The Medal to be given to the winner of the first prize.

7. The local Society or Ploughing Association shall decide what class of ploughs shall compete for the Medal, and if so agreed, may offer it for competition to the class of plough most generally in use in the district.

8. The local Society or Committee may, if they desire, arrange to let each Ploughman have one person to guide the horses for the first two and the last two furrows, but in no case shall Ploughmen receive any other assistance, and their work must not be set up or touched by others. Attention should be given to the firmness and sufficiency of the work below, more than to its neatness above the surface.

9. The local Committee is required to fix the time to be allowed for ploughing the portion of land, and they are recommended that the time be at the rate of not more than fourteen hours per imperial acre on light land, and eighteen hours on heavy or stony land.

TRACTOR PLOUGHING.

FORM OF REPORT.

I, _____ of _____, Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the _____ Association at _____ in the county of _____ on the _____ when _____ Tractor ploughs competed ; _____ of land were assigned to each, and _____ hours were allowed for the execution of the work. The sum of £ _____ was awarded as follows :—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1-7. Rules for Horse Ploughing apply.

8. Attention should be given to the firmness and sufficiency of the work below, more than to its neatness above the surface.

9. The local Committee is required to fix the time to be allowed for ploughing the portion of land, and they are recommended that the time be at the rate of not more than seven hours per imperial acre on light land, and nine hours on heavy or stony land.

NOTE.—The attention of the Directors of the Society has frequently been drawn to certain irregularities which have occurred in connection with the conduct of Ploughing Matches and the completion of the Reports thereon. Complaints have been made (a) that the allotted amount of ground has not been ploughed, within the specified time, by the competitor awarded the first prize ; (b) that the Report sent to this Society has been signed by a Member of the Society who was not present at the Match. It has to be pointed out that any infringement of the above Rules by a local Society or Ploughing Association will render that Society or Association liable, at the discretion of the Board of Directors, to be debarred from receiving the Society's Medals.

2. MEDALS FOR HOEING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first Premium at Hoeing Competitions, provided a Report on the official form is made to the Secretary within a month of the Competition by a Member of the Society. Forms of Report to be had on application.

RULES OF COMPETITION.

1. All Matches must be at the instance of a local Society or Hoeing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All Reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can only report one Match : and same Competitor cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal there must have been twelve hoes in competition, and not less than Three Pounds awarded in prizes by the local Society or Association. The Medal to be given to the winner of the first prize.

7. The time to be allowed to be decided by the local Committee, but in no case to exceed two hours for two drills of 100 yards each, the third drill being unoccupied, so that Competitors do not interfere with their neighbour's work.

8. Competitors must finish their work as they go along—no turning back or after-dressing allowed. Hand-picking or transplanting shall be strictly prohibited.

9. A Committee shall be appointed to watch the work, and any Competitor found transplanting or otherwise not complying with the Rules shall have his number withdrawn, and be debarred from receiving any prize which might otherwise have been awarded to him.

NOTE.—Medals will be awarded under similar conditions for Competitions in hand-singling.

3. CERTIFICATES AND MEDALS FOR LONG FARM SERVICE.

Certificates and Silver Medals for long service will be awarded by the Society to farm servants, male or female, having an approved service in Scotland of not less than thirty years (not necessarily continuous) —(a) with one employer on the same or different holdings ; (b) on the same holding with different employers.

Special Certificates and Silver Gilt Medals are also awarded to farm servants, male or female, having an approved service in Scotland of not less than forty-five years (not necessarily continuous), on similar conditions of employment as the above.

Forms of Application are obtainable from the Secretary, 8 Eglinton Crescent, Edinburgh.

War Service to count towards the time required for qualification,

where farm servants have returned to same service or employment with same farmer or his family.

The award is strictly confined to workers, such as Ploughmen, Cattlemen, and Shepherds.

Domestic and House Servants and Estate workers, such as Foresters, Carters, Grooms, &c., are not eligible.

Awards in 1945.

The following received the Special Certificate and Silver Gilt Medal for service of forty-five years and over :—

Anderson, Alexander B., Easter Softlaw, Kelso.
 Barnett, Barlow, Penston, Macmerry.
 Fairgrieve, David. Penston, Macmerry.
 Kennedy, Hugh, Roundhouse, Breachacha.
 M'Kendrick, Alexander W., Westfield, Inveresk.
 M'Nicol, Duncan, Strathmollach, Argyll.
 Todd, William, Balinamoil, Southend, Argyll.

The following received the Silver Medal and Certificate for service of from thirty to forty-four years :—

Alexander, Robert, Glenalmond, Buchanty.
 Anderson, John L., Craighill, Ettrick.
 Anderson, Robert, Hyndhope, Ettrick.
 Barnett, Barlow, Penston, Macmerry.
 Broekie, Robert H., Glenormiston Lodge, Innerleithen.
 Brotherston, Peter, Blythe, Lauder.
 Brown, William M'T., Changue, Port William.
 Bruce, Sinclair, Henhill, Forteviot.
 Campbell, Andrew, Pitlandie, Stanley.
 Campbell, Archibald, Waterhead, Fintry.
 Craig, John, Milne Graden, Coldstream.
 Crowe, Duncan C., Rossie Farm School, Montrose.
 Dunn, David, Rosehill, Inveresk.
 Esson, William J., Newton Cottage, Midmar.
 Fairgrieve, David, Penston, Macmerry.
 Fergie, Elizabeth, Clairvale, Paxton.
 Greenshields, Mary, Netherplace, Newton Mearns.
 Henderson, George, Mount Benger, Yarrow.
 Henderson, Peter M'G., Powblack, Kippen Station.
 Johnston, James, Dalveen, Durrisddeer.
 Kelly, James, Ivy Bank, Corsock.
 Kennedy, Helen, Moss Cottages, Blinkbonny.
 Kerr, William, Wallyford Farm, Musselburgh.
 Kyle, Adam, Drumdow, Ervie.
 Laing, John, West Dron, Bridge of Earn.
 Lorimer, John, Badlieu, Tweedsmuir.
 MacDonald, Donald, Scotsburn, Kildary.

MacGillivray, Donald, Cultorsay, Islay.
M'Minn, Robert, Dalmacallan, Moniaive.
M'Phail, Neil, Plean Farm Cottages, Stirling.
M'Shane, James, Arbrack, Whithorn.
Middleton. James, Barnyards of Findlater, Portsoy.
Moyes, George, Dales Cottages, Dunfermline.
Nichol, George, Ovor Kirkhope, Ettrick.
Rae, William, Bairnkine, Jedburgh.
Raffan, William, Loch Street, Whitehills.
Rennie, George, Nethermill, Tarves.
Robertson, John, Ormiston Mains, Ormiston.
Rodger, Mary, 57 Newbigging, Musselburgh.
Ross, Andrew, East Bearford, Haddington.
Ross, William H., Stevenson Mains, Haddington.
Rutherford, John, Glenalmond, Perthshire.
Sharpe, Thomas, Dalveen, Durrisdeer.
Sim, William, Broadland, Cairney.
Sinclair, Alexander S., Proncymains, Dornoch.
Sinclair, Duncan, Ballygroggan, Campbeltown.
Skimming, Robert A., Barnbarroch, Whauphill.
Strachan, John, Greenlaw Mains Cottage, Milton Bridge.
Symons, David, 3 West Middleton, Gorebridge.
Turner, Gregor, Bairnkine, Jedburgh.
Wardrop, George S., Shaw Cottage, Kilmaurs.
Winter, John W., Balconnel, Brechin.

MEMBERS ADMITTED SINCE THE LIST WAS PUBLISHED IN APRIL 1945.

ARRANGED ACCORDING TO SHOW DISTRICTS.

* (ELECTED 9TH JANUARY 1946 AND 5TH JUNE 1946.)

1.—GLASGOW DIVISION

ARGYLL

Admitted

- 1946 Cameron, Archibald, Manager, Laga Farm, Glenborrodnie, Acharacle
1946 Cameron, James A., Ardery, Strontian
1946 Fisher, John, Argyll Estate Office, Campbeltown
1946 Holt, Mrs A. L., Arisaig, Appin
1946 Swan, Charles James, "Ronebhal," Glenramskill, Campbeltown

AYR

- 1946 Adam, Arthur, 36 John Finnie Street, Kilmarnock
1946 Adams, William, Ardnell, Portencross, West Kilbride
1946 Drummond, Robert, Straid, Lendalfoot, Girvan
1946 Drummond, Mrs, Straid, Lendalfoot, Girvan
1946 Fraser, Hector, N.D.A. (South Ayrshire Agricultural Executive Committee), 29 Miller Road, Ayr

- 1946 Murdoch, James, jun., Knockdon, Straiton, Maybole
1946 Stevenson, Mrs R. H. U., Corseclays House, Ballantrae, by Girvan

LANARK

- 1946 Baillie, James, Hyndshaw Farm, Carluke
1946 Begg, Hugh, 1243 Shettleston Road, Glasgow, E.2
1946 Lohoui, Robert, jun., Holmhills Farm, Cambuslang
1946 Primrose, Robert A., Centre Street Mills, Tradeston, Glasgow, C.5
1946 Taylor, James Morrison, M R.C.V.S., Cathkin, Rutherglen

RENFREW

- 1946 Carpenter, Thomas Dunlop (Metal Containers, Ltd.), Moorpark Works, Renfrew.
1946 Clark - MacLachlan, George A., c/o MacLachlan, Clark & Co., Ltd., 10 Laster Road, Hillington, Glasgow

2.—PERTH DIVISION

ANGUS

(WESTERN DISTRICT)

- 1946 Arbuckle, Peter Alston, Lundie Castle, Dundee
1946 Low-Mitchell, Dugald Ian, Kyleakin, Broughty Ferry

FIFE

- 1946 Allen, Frank Stanley, Lamorna, Hepburn Gardens, St Andrews
1946 Arbuckle, Andrew Alston, Lower Luthrie, Cupar

- 1946 Arbuckle, John, Logie, Newburgh
1946 Bett, David B., N.D.A., C.D.A., Brighton Road, Cupar
1946 Borthwick, Ramsay, jun., 38 Fairykirk Road, Rosyth
1946 Buchanan, John, Drumtenant, Ladybank
1946 Danskin, M. B., Haulage Contractor, Strathkinnes
1946 Howie, John Watt, Balcormo, Pittenweem
1946 Lang, John, Hayston, Lenchara
1946 M'Laren, James, Cults Farm, Ladybank
1946 Meiklem, John, Muttonhill, Kirkcaldy
1946 Meiklem, Leslie Park, Dunnikier Home Farm, Kirkcaldy

- 1946 Morris, A. I., jun., West Pitkierie,
Anstruther
1946 Peterkin, William Conon Grant, W.S.
(Pagan & Osborne), British Linen
Bank, Cupar
1946 Robertson, William L., East Grange-
muir, Pittenweem
1946 Thomson, James, Balhouslie, Anstruther
1946 Tunstall, R., Pitcorthie, Anstruther
1946 Weir, James W., Kingask, St Andrews

- 1946 Wilson, Matthew S., Easter Flisk,
Newburgh

PERTH

(PERTH SHOW DISTRICT)

- 1946 Murdoch, William A. D., Over Bench,
Stanley

3.—STIRLING DIVISION

DUMBARTON

- 1946 Holmes, Andrew, Westerdunes, Helens-
burgh
1946 Preston, Frank A. B., 6 Buchanan
Street, Milngavie

PERTH

(STIRLING SHOW DISTRICT)

- 1946 Thomas, Robert Hannan, Woodlands,
Dunblane

STIRLING

- 1946 Downie, Robert, Knock of Ronald,
Kippen
1946 Forrester, Alexander F. C., Airth Castle,
Falkirk
1946 Kerr, John R., Cockspow, by Stirling
1946 Kerr, William, Cockspow, by Stirling
1946 M'Donald, Oliver, Ballat Farm, Balfour
Station
1946 More, John, Mains of Boquhan, Kippen
1946 More, William T., Mains of Boquhan,
Kippen
1946 Robertson, Alexander Irvine, Solicitor,
24 King Street, Stirling

4.—EDINBURGH DIVISION

MID-LOTHIAN

- 1946 Elliott, Frederick J., B.Sc., Royal (Dick)
Veterinary College, Edinburgh 9
1946 Fletcher, Archibald, Cornbank, Pen-
cuk
1946 Letham, Adam, 87 Comely Bank Avenue,
Edinburgh 4

- 1946 Lindsay, William, Solicitor, 57 Queen
Street, Edinburgh 2
1946 Martin, J. B., 68 Cowan Road, Edin-
burgh 11
1946 Ramsay, Douglas Mouro, of Bowland,
Galashiels (Midlothian)
1946 Young, Harris M., 5 Grassmarket, Edin-
burgh

5.—ABERDEEN DIVISION

ABERDEEN

- 1946 Cowan, Lieut.-Colonel Ian C., O.B.E.,
D.S.O., M.C., Mains of Abergeldie,
Ballater
1946 Cruickshank, R. W., Auchanachie,
Cairnie
1946 Duguid, Lieut.-Colonel T. C. (Retd.),
Belhelvie Lodge, Balmedie
1946 Duncan, John, Hall Cottage, Kirkton,
Durris, Drumoak
1946 Garvie, John T. (R. G. Garvie & Sons),
2 Canal Road, Aberdeen
1946 Gordon, David, of Haddo, Haddo House,
Aberdeenshire
1946 GRANT, Sir F. C., Bt., House of Mony-
musk, Monymusk

- 1946 Maitland, James, East Balhagardy,
Inverurie
1946 Melvin, A. W., Coniccleugh, Cairnie
1946 Murray, E. G., M.R.C.V.S., West Bank,
George Street, Huntly
1946 Roger, J. M., Haddoch, Huntly

ANGUS

(EASTERN DISTRICT)

- 1946 Breckenridge, David T., Cauldecots,
Arbroath
1946 Milne, Johnston David, Pert Farm,
Laurencekirk (Angus)

6.—DUMFRIES DIVISION

KIRKCUDBRIGHT

- 1946 AITSA, The Marquis of, Hensol, Mossdale, Castle-Douglas

7.—INVERNESS DIVISION**INVERNESS**

- 1946 Baillie, Michael Evan V., Ballindarroch, Scanipport
 1946 Buchanan, John, Kinchurdy House, Boat of Garten
 1946 Davidson, Alexander, Kerrowaird, Petty
 1946 Davidson, George, Manager, Scottish Agricultural Industries, Ltd., Falcon Square, Inverness
 1946 Forbes, Thomas M., Milton of Connage, Ardersier
 1946 Fraser, John (Manager), Corrybrough, Inverness
 1946 Henderson, Roderick, Agricultural Merchant, Station Square, Inverness
 1946 Riggs, Kenneth, Whin Park, Ardross Street, Inverness
 1946 Rose, James, Mains of Connage, Ardersier
 1946 Walker, Francis Donald B., Leys Castle, Inverness

MORAY

- 1946 Gordon, James, William Reid, Ltd., Engineers, Forres

NAIRN

- 1946 Adam, Walter R., The Park Farm, Nairn
 1946 Brander, William R., Bogside of Boath, Auldearn

- 1946 Gordon, R. J. R., Merchant, Nairn
 1946 Law, H. M., Cawdor Estate Office, Nairn
 1946 Mackenzie, D. H., Mains of Househill, Nairn
 1946 Mackintosh-Walker, Captain C. M., of Geddes, Nairn
 1946 Middleton, D. L., Braesside of Lethen, Nairn
 1946 Smart, P. G., Burnside of Lethen, Nairn
 1946 Wilson, A. R., Brightmoney, Nairn

ROSS AND CROMARTY

- 1946 BROOKE, Sir John, Bt., Fearn Lodge, Ardgay
 1946 George, William, Urquhart Farm, Conon Bridge
 1946 Riggs, James, Fettes, Munloch
 1946 Ropner, Lieut.-Colonel Richard, Aldie, Tain

SUTHERLAND

- 1946 Campbell, Colin John, Bal Blair, Inver-shin
 1946 MacLeod, Kenneth, Oldshoremore, by Lairg
 1946 Murray, George, Morvich, Rogart
 1946 Rutherford, John Gordon, Proncy, Dornoch

8.—BORDER DIVISION**EMBRACING THE**

COUNTIES OF BERWICK (INCLUDING THE TOWN OF BERWICK-UPON-TWEED), PEEBLES, ROXBURGH, AND SELKIRK

ROXBURGH

- 1946 RAMSAY-FAIRFAX-LUCY, Lady, Maxton, St Boswells

SELKIRK

- 1946 M'LEAN, Sir Robert, of Laidlawstiel, Clovenfords
 1946 Pringle, George Arthur Wyndham, Torwoodlee, Galashiels

ENGLAND AND WALES

- 1946 Bryden, George (Marshall, Sons & Co., Ltd.), Britannia Works, Gainsborough, Lincs.
 1946 Forker, K. A., M.R.C.V.S., 19 Glendale Avenue, Monkseaton, Northumberland
 1946 Gregory, Leslie (Walker Gregory & Co., Ltd.), Wellington, Somerset
 1946 Hamilton, Robert, Imperial Chemical Industries, Ltd., Nobel House, 3 Buckingham Gate, London, S.W.1
 1946 Hine, Sydney Victor (Day, Son & Hewitt, Ltd.), 22 Dorset Street, Baker Street, London, W.1
 1946 Johnson, J. A. (India Tyre and Rubber Co., Ltd.), Athenaeum Chambers, 71 Temple Row, Birmingham 2

- 1946 Mason, The Hon. Mrs Michael, Scott's House, Eynsham Park, Witney, Oxon.
 1946 Richards, Kenneth L. (Spillers, Limited), 40 St Mary Axe, London, E.C.3
 1946 Roice, C. D. (International Harvester Co. of Great Britain, Ltd.), 259 City Road, London, E.C.1
 1946 Sinclair, Ambrose Lancaster, Moor Farm, Cowdray Park, Midhurst, Sussex
 1946 Thompson, J. Harold, B.Sc. (Agric.), British Basic Slag, Ltd., Wellington House, Buckingham Gate, London, S.W.1
 1946 Wood, John, 124 Little Todham, Midhurst, Sussex

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